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SEQUENCE LISTING

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Stallings, William C.

<120> GLYPHOSATE TOLERANT 5-ENOLPYRUVYLSHIKIMATE-3-PHOSPHATE SYNTHASES

<130> 11899.0175.CNUS01 MOBT:175-2

<140> 09/464,099

<141> 1999-12-16

<150> US 09/137,440

<151> 1998-08-20

<150> US 08/833,485

<151> 1997-04-07

<150> US 08/306,063

<151> 1994-09-13

<150> US 07/749,611

<151> 1991-08-28

<150> US 07/576,537

<151> 1990-08-31

<160> 70

<170> PatentIn version 3.0

<210> 1

<211> 597

<212> DNA

<213> Figwort mosaic virus

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aggaagaatt cttagtccaa agcctcaaca aggtcagggt acagagtctc caaaccatta 180

gccaaaagct acaggagatc aatgaagaat cttcaatcaa agtaaactac tgttccagca 240

catgcatcat ggtcagtaag tttcagaaaa agacatccac cgaagactta aagttagtgg 300

gcatctttga aagtaatctt gtcaacatcg agcagctggc ttgtggggac cagacaaaaa 360

aggaatgggtg cagaattggt aggcgcacct accaaaagca tctttgcctt tattgcaaag 420

ataaagcaga ttcctctagt acaagtgggg aacaaaataa cgtggaaaag agctgtcctg 480

108

F

acagcccact cactaatgcg tatgacgaac gcagtgaaga ccacaaaaga attccctcta 540

tataagaagg cattcattcc catttgaagg atcatcagat actaaccaat atttctc 597

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<213> Agrobacterium sp.

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<221> CDS

<222> (62)..(1426)

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Met Ser His Gly Ala Ser Ser Arg Pro Ala Thr Ala Arg Lys Ser Ser

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10

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ggc ctt tcc gga acc gtc cgc att ccc ggc gac aag tcg atc tcc cac 157

Gly Leu Ser Gly Thr Val Arg Ile Pro Gly Asp Lys Ser Ile Ser His

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25

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cgg tcc ttc atg ttc ggc ggt ctc gcg agc ggt gaa acg cgc atc acc 205

Arg Ser Phe Met Phe Gly Gly Leu Ala Ser Gly Glu Thr Arg Ile Thr

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ggc ctt ctg gaa ggc gag gac gtc atc aat acg ggc aag gcc atg cag 253

Gly Leu Leu Glu Gly Glu Asp Val Ile Asn Thr Gly Lys Ala Met Gln

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gcc atg ggc gcc agg atc cgt aag gaa ggc gac acc tgg atc atc gat 301

Ala Met Gly Ala Arg Ile Arg Lys Glu Gly Asp Thr Trp Ile Ile Asp

65

70

75

80

ggc gtc ggc aat ggc ggc ctc ctg gcg cct gag gcg ccg ctc gat ttc 349

Gly Val Gly Asn Gly Gly Leu Leu Ala Pro Glu Ala Pro Leu Asp Phe

85

90

95

ggc aat gcc gcc acg ggc tgc cgc ctg acc atg ggc ctc gtc ggg gtc 397

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100

105

110

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Tyr Asp Phe Asp Ser Thr Phe Ile Gly Asp Ala Ser Leu Thr Lys Arg

115

120

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ccg atg ggc cgc gtg ttg aac ccg ctg cgc gaa atg ggc gtg cag gtg 493

Pro Met Gly Arg Val Leu Asn Pro Leu Arg Glu Met Gly Val Gln Val

130

135

140

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| aaa tcg gaa gac ggt gac cgt ctt ccc gtt acc ttg cgc ggg ccg aag | 541 |
| Lys Ser Glu Asp Gly Asp Arg Leu Pro Val Thr Leu Arg Gly Pro Lys | |
| 145 150 155 160 | |
| acg ccg acg ccg atc acc tac cgc gtg ccg atg gcc tcc gca cag gtg | 589 |
| Thr Pro Thr Pro Ile Thr Tyr Arg Val Pro Met Ala Ser Ala Gln Val | |
| 165 170 175 | |
| aag tcc gcc gtg ctg ctc gcc ggc ctc aac acg ccc ggc atc acg acg | 637 |
| Lys Ser Ala Val Leu Leu Ala Gly Leu Asn Thr Pro Gly Ile Thr Thr | |
| 180 185 190 | |
| gtc atc gag ccg atc atg acg cgc gat cat acg gaa aag atg ctg cag | 685 |
| Val Ile Glu Pro Ile Met Thr Arg Asp His Thr Glu Lys Met Leu Gln | |
| 195 200 205 | |
| ggc ttt ggc gcc aac ctt acc gtc gag acg gat gcg gac ggc gtg cgc | 733 |
| Gly Phe Gly Ala Asn Leu Thr Val Glu Thr Asp Ala Asp Gly Val Arg | |
| 210 215 220 | |
| acc atc cgc ctg gaa ggc cgc ggc aag ctc acc ggc caa gtc atc gac | 781 |
| Thr Ile Arg Leu Glu Gly Arg Gly Lys Leu Thr Gly Gln Val Ile Asp | |
| 225 230 235 240 | |
| gtg ccg ggc gac ccg tcc tcg acg gcc ttc ccg ctg gtt gcg gcc ctg | 829 |
| Val Pro Gly Asp Pro Ser Ser Thr Ala Phe Pro Leu Val Ala Ala Leu | |
| 245 250 255 | |
| ctt gtt ccg ggc tcc gac gtc acc atc ctc aac gtg ctg atg aac ccc | 877 |
| Leu Val Pro Gly Ser Asp Val Thr Ile Leu Asn Val Leu Met Asn Pro | |
| 260 265 270 | |
| acc cgc acc ggc ctc atc ctg acg ctg cag gaa atg ggc gcc gac atc | 925 |
| Thr Arg Thr Gly Leu Ile Leu Thr Leu Gln Glu Met Gly Ala Asp Ile | |
| 275 280 285 | |
| gaa gtc atc aac ccg cgc ctt gcc ggc ggc gaa gac gtg gcg gac ctg | 973 |
| Glu Val Ile Asn Pro Arg Leu Ala Gly Gly Glu Asp Val Ala Asp Leu | |
| 290 295 300 | |
| cgc gtt cgc tcc tcc acg ctg aag ggc gtc acg gtg ccg gaa gac cgc | 1021 |
| Arg Val Arg Ser Ser Thr Leu Lys Gly Val Thr Val Pro Glu Asp Arg | |
| 305 310 315 320 | |
| gcg cct tcg atg atc gac gaa tat ccg att ctc gct gtc gcc gcc gcc | 1069 |
| Ala Pro Ser Met Ile Asp Glu Tyr Pro Ile Leu Ala Val Ala Ala Ala | |
| 325 330 335 | |
| ttc gcg gaa ggg gcg acc gtg atg aac ggt ctg gaa gaa ctc cgc gtc | 1117 |
| Phe Ala Glu Gly Ala Thr Val Met Asn Gly Leu Glu Glu Leu Arg Val | |
| 340 345 350 | |
| aag gaa agc gac cgc ctc tcg gcc gtc gcc aat ggc ctc aag ctc aat | 1165 |
| Lys Glu Ser Asp Arg Leu Ser Ala Val Ala Asn Gly Leu Lys Leu Asn | |

| 355 | 360 | 365 | |
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| ggc gtg gat tgc gat gag ggc gag acg tcg ctc gtc gtg cgc ggc cgc | | | 1213 |
| Gly Val Asp Cys Asp Glu Gly Glu Thr Ser Leu Val Val Arg Gly Arg | | | |
| 370 | 375 | 380 | |
| cct gac ggc aag ggg ctc ggc aac gcc tcg ggc gcc gcc gtc gcc acc | | | 1261 |
| Pro Asp Gly Lys Gly Leu Gly Asn Ala Ser Gly Ala Ala Val Ala Thr | | | |
| 385 | 390 | 395 | 400 |
| cat ctc gat cac cgc atc gcc atg agc ttc ctc gtc atg ggc ctc gtg | | | 1309 |
| His Leu Asp His Arg Ile Ala Met Ser Phe Leu Val Met Gly Leu Val | | | |
| 405 | 410 | 415 | |
| tcg gaa aac cct gtc acg gtg gac gat gcc acg atg atc gcc acg agc | | | 1357 |
| Ser Glu Asn Pro Val Thr Val Asp Asp Ala Thr Met Ile Ala Thr Ser | | | |
| 420 | 425 | 430 | |
| ttc ccg gag ttc atg gac ctg atg gcc ggg ctg ggc gcg aag atc gaa | | | 1405 |
| Phe Pro Glu Phe Met Asp Leu Met Ala Gly Leu Gly Ala Lys Ile Glu | | | |
| 435 | 440 | 445 | |
| ctc tcc gat acg aag gct gcc tgatgacctt cacaatcgcc atcgatggtc | | | 1456 |
| Leu Ser Asp Thr Lys Ala Ala | | | |
| 450 | 455 | | |
| ccgctgcggc cggcaagggg acgctctcgc gccgtatcgc ggaggtctat ggctttcacc | | | 1516 |
| atctcgatac gggcctgacc tategcgcca cggccaaagc gctgctcgat cgcggcctgt | | | 1576 |
| cgcttgatga cgaggcgggt gcggccgatg tcgcccgaat tctcgatctt gccgggctcg | | | 1636 |
| accggtcggg gctgtcggcc catgccatcg gcgaggcggc ttcgaagatc gcggtcatgc | | | 1696 |
| cctcgggtgcg gcgggcgctg gtcgagggcg agcgcagctt tgccggcgct gagccgggca | | | 1756 |
| cggtgctgga tggacgcgat atcggcacgg tggctctgcc ggatgcgccg gtgaagctct | | | 1816 |
| atgtcacgcg gtcaccggaa gtgcgcgcga aacgccgcta tgacgaaatc ctcggcaatg | | | 1876 |
| gcggggttggc cgattacggg acgatcctcg aggatatccg ccgccgcgac gagcgggaca | | | 1936 |
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<400> 3

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| 1 | | | | 5 | | | | | 10 | | | | 15 | | |

|||

F

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Arg Ser Phe Met Phe Gly Gly Leu Ala Ser Gly Glu Thr Arg Ile Thr
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Gly Leu Leu Glu Gly Glu Asp Val Ile Asn Thr Gly Lys Ala Met Gln
50 55 60

Ala Met Gly Ala Arg Ile Arg Lys Glu Gly Asp Thr Trp Ile Ile Asp
65 70 75 80

Gly Val Gly Asn Gly Gly Leu Leu Ala Pro Glu Ala Pro Leu Asp Phe
85 90 95

Gly Asn Ala Ala Thr Gly Cys Arg Leu Thr Met Gly Leu Val Gly Val
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Tyr Asp Phe Asp Ser Thr Phe Ile Gly Asp Ala Ser Leu Thr Lys Arg
115 120 125

Pro Met Gly Arg Val Leu Asn Pro Leu Arg Glu Met Gly Val Gln Val
130 135 140

Lys Ser Glu Asp Gly Asp Arg Leu Pro Val Thr Leu Arg Gly Pro Lys
145 150 155 160

Thr Pro Thr Pro Ile Thr Tyr Arg Val Pro Met Ala Ser Ala Gln Val
165 170 175

Lys Ser Ala Val Leu Leu Ala Gly Leu Asn Thr Pro Gly Ile Thr Thr
180 185 190

Val Ile Glu Pro Ile Met Thr Arg Asp His Thr Glu Lys Met Leu Gln
195 200 205

Gly Phe Gly Ala Asn Leu Thr Val Glu Thr Asp Ala Asp Gly Val Arg
210 215 220

Thr Ile Arg Leu Glu Gly Arg Gly Lys Leu Thr Gly Gln Val Ile Asp
 225 230 235 240

Val Pro Gly Asp Pro Ser Ser Thr Ala Phe Pro Leu Val Ala Ala Leu
 245 250 255

Leu Val Pro Gly Ser Asp Val Thr Ile Leu Asn Val Leu Met Asn Pro
 260 265 270

Thr Arg Thr Gly Leu Ile Leu Thr Leu Gln Glu Met Gly Ala Asp Ile
 275 280 285

Glu Val Ile Asn Pro Arg Leu Ala Gly Gly Glu Asp Val Ala Asp Leu
 290 295 300

Arg Val Arg Ser Ser Thr Leu Lys Gly Val Thr Val Pro Glu Asp Arg
 305 310 315 320

Ala Pro Ser Met Ile Asp Glu Tyr Pro Ile Leu Ala Val Ala Ala Ala
 325 330 335

Phe Ala Glu Gly Ala Thr Val Met Asn Gly Leu Glu Glu Leu Arg Val
 340 345 350

Lys Glu Ser Asp Arg Leu Ser Ala Val Ala Asn Gly Leu Lys Leu Asn
 355 360 365

Gly Val Asp Cys Asp Glu Gly Glu Thr Ser Leu Val Val Arg Gly Arg
 370 375 380

Pro Asp Gly Lys Gly Leu Gly Asn Ala Ser Gly Ala Ala Val Ala Thr
 385 390 395 400

His Leu Asp His Arg Ile Ala Met Ser Phe Leu Val Met Gly Leu Val
 405 410 415

Ser Glu Asn Pro Val Thr Val Asp Asp Ala Thr Met Ile Ala Thr Ser
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Phe Pro Glu Phe Met Asp Leu Met Ala Gly Leu Gly Ala Lys Ile Glu
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113

F

Leu Ser Asp Thr Lys Ala Ala
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<213> Agrobacterium sp.

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Met Ser His Ser Ala Ser Pro Lys Pro
1 5

gca acc gcc cgc cgc tcg gag gca ctc acg ggc gaa atc cgc att ccg 160
Ala Thr Ala Arg Arg Ser Glu Ala Leu Thr Gly Glu Ile Arg Ile Pro
10 15 20 25

ggc gac aag tcc atc tcg cat cgc tcc ttc atg ttt ggc ggt ctc gca 208
Gly Asp Lys Ser Ile Ser His Arg Ser Phe Met Phe Gly Gly Leu Ala
30 35 40

tcg ggc gaa acc cgc atc acc ggc ctt ctg gaa ggc gag gac gtc atc 256
Ser Gly Glu Thr Arg Ile Thr Gly Leu Leu Glu Gly Glu Asp Val Ile
45 50 55

aat aca ggc cgc gcc atg cag gcc atg ggc gcg aaa atc cgt aaa gag 304
Asn Thr Gly Arg Ala Met Gln Ala Met Gly Ala Lys Ile Arg Lys Glu
60 65 70

ggc gat gtc tgg atc atc aac ggc gtc ggc aat ggc tgc ctg ttg cag 352
Gly Asp Val Trp Ile Ile Asn Gly Val Gly Asn Gly Cys Leu Leu Gln
75 80 85

ccc gaa gct gcg ctc gat ttc ggc aat gcc gga acc ggc gcg cgc ctc 400
Pro Glu Ala Ala Leu Asp Phe Gly Asn Ala Gly Thr Gly Ala Arg Leu
90 95 100 105

acc atg ggc ctt gtc ggc acc tat gac atg aag acc tcc ttt atc ggc 448
Thr Met Gly Leu Val Gly Thr Tyr Asp Met Lys Thr Ser Phe Ile Gly
110 115 120

gac gcc tcg ctg tcg aag cgc ccg atg ggc cgc gtg ctg aac ccg ttg 496
Asp Ala Ser Leu Ser Lys Arg Pro Met Gly Arg Val Leu Asn Pro Leu
125 130 135

| | |
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| ctg acg ctg atc ggc ccg aag acg gcc aat ccg atc acc tat cgc gtg Leu Thr Leu Ile Gly Pro Lys Thr Ala Asn Pro Ile Thr Tyr Arg Val 155 160 165 | 592 |
| ccg atg gcc tcc gcg cag gta aaa tcc gcc gtg ctg ctc gcc ggt ctc Pro Met Ala Ser Ala Gln Val Lys Ser Ala Val Leu Leu Ala Gly Leu 170 175 180 185 | 640 |
| aac acg ccg ggc gtc acc acc gtc atc gag ccg gtc atg acc cgc gac Asn Thr Pro Gly Val Thr Thr Val Ile Glu Pro Val Met Thr Arg Asp 190 195 200 | 688 |
| cac acc gaa aag atg ctg cag ggc ttt ggc gcc gac ctc acg gtc gag His Thr Glu Lys Met Leu Gln Gly Phe Gly Ala Asp Leu Thr Val Glu 205 210 215 | 736 |
| acc gac aag gat ggc gtg cgc cat atc cgc atc acc ggc cag ggc aag Thr Asp Lys Asp Gly Val Arg His Ile Arg Ile Thr Gly Gln Gly Lys 220 225 230 | 784 |
| ctt gtc ggc cag acc atc gac gtg ccg ggc gat ccg tca tcg acc gcc Leu Val Gly Gln Thr Ile Asp Val Pro Gly Asp Pro Ser Ser Thr Ala 235 240 245 | 832 |
| ttc ccg ctc gtt gcc gcc ctt ctg gtg gaa ggt tcc gac gtc acc atc Phe Pro Leu Val Ala Ala Leu Leu Val Glu Gly Ser Asp Val Thr Ile 250 255 260 265 | 880 |
| cgc aac gtg ctg atg aac ccg acc cgt acc ggc ctc atc ctc acc ttg Arg Asn Val Leu Met Asn Pro Thr Arg Thr Gly Leu Ile Leu Thr Leu 270 275 280 | 928 |
| cag gaa atg ggc gcc gat atc gaa gtg ctc aat gcc cgt ctt gca ggc Gln Glu Met Gly Ala Asp Ile Glu Val Leu Asn Ala Arg Leu Ala Gly 285 290 295 | 976 |
| ggc gaa gac gtc gcc gat ctg cgc gtc agg gct tcg aag ctc aag ggc Gly Glu Asp Val Ala Asp Leu Arg Val Arg Ala Ser Lys Leu Lys Gly 300 305 310 | 1024 |
| gtc gtc gtt ccg ccg gaa cgt gcg ccg tcg atg atc gac gaa tat ccg Val Val Val Pro Pro Glu Arg Ala Pro Ser Met Ile Asp Glu Tyr Pro 315 320 325 | 1072 |
| gtc ctg gcg att gcc gcc tcc ttc gcg gaa ggc gaa acc gtg atg gac Val Leu Ala Ile Ala Ala Ser Phe Ala Glu Gly Glu Thr Val Met Asp 330 335 340 345 | 1120 |
| ggg ctc gac gaa ctg cgc gtc aag gaa tcg gat cgt ctg gca gcg gtc Gly Leu Asp Glu Leu Arg Val Lys Glu Ser Asp Arg Leu Ala Ala Val | 1168 |

Gly Leu Leu Glu Gly Glu Asp Val Ile Asn Thr Gly Arg Ala Met Gln
50 55 60

Ala Met Gly Ala Lys Ile Arg Lys Glu Gly Asp Val Trp Ile Ile Asn
65 70 75 80

Gly Val Gly Asn Gly Cys Leu Leu Gln Pro Glu Ala Ala Leu Asp Phe
85 90 95

Gly Asn Ala Gly Thr Gly Ala Arg Leu Thr Met Gly Leu Val Gly Thr
100 105 110

Tyr Asp Met Lys Thr Ser Phe Ile Gly Asp Ala Ser Leu Ser Lys Arg
115 120 125

Pro Met Gly Arg Val Leu Asn Pro Leu Arg Glu Met Gly Val Gln Val
130 135 140

Glu Ala Ala Asp Gly Asp Arg Met Pro Leu Thr Leu Ile Gly Pro Lys
145 150 155 160

Thr Ala Asn Pro Ile Thr Tyr Arg Val Pro Met Ala Ser Ala Gln Val
165 170 175

Lys Ser Ala Val Leu Leu Ala Gly Leu Asn Thr Pro Gly Val Thr Thr
180 185 190

Val Ile Glu Pro Val Met Thr Arg Asp His Thr Glu Lys Met Leu Gln
195 200 205

Gly Phe Gly Ala Asp Leu Thr Val Glu Thr Asp Lys Asp Gly Val Arg
210 215 220

His Ile Arg Ile Thr Gly Gln Gly Lys Leu Val Gly Gln Thr Ile Asp
225 230 235 240

Val Pro Gly Asp Pro Ser Ser Thr Ala Phe Pro Leu Val Ala Ala Leu
245 250 255

Leu Val Glu Gly Ser Asp Val Thr Ile Arg Asn Val Leu Met Asn Pro
260 265 270

10
M

F

Thr Arg Thr Gly Leu Ile Leu Thr Leu Gln Glu Met Gly Ala Asp Ile
 275 280 285

Glu Val Leu Asn Ala Arg Leu Ala Gly Gly Glu Asp Val Ala Asp Leu
 290 295 300

Arg Val Arg Ala Ser Lys Leu Lys Gly Val Val Val Pro Pro Glu Arg
 305 310 315 320

Ala Pro Ser Met Ile Asp Glu Tyr Pro Val Leu Ala Ile Ala Ala Ser
 325 330 335

Phe Ala Glu Gly Glu Thr Val Met Asp Gly Leu Asp Glu Leu Arg Val
 340 345 350

Lys Glu Ser Asp Arg Leu Ala Ala Val Ala Arg Gly Leu Glu Ala Asn
 355 360 365

Gly Val Asp Cys Thr Glu Gly Glu Met Ser Leu Thr Val Arg Gly Arg
 370 375 380

Pro Asp Gly Lys Gly Leu Gly Gly Gly Thr Val Ala Thr His Leu Asp
 385 390 395 400

His Arg Ile Ala Met Ser Phe Leu Val Met Gly Leu Ala Ala Glu Lys
 405 410 415

Pro Val Thr Val Asp Asp Ser Asn Met Ile Ala Thr Ser Phe Pro Glu
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Phe Met Asp Met Met Pro Gly Leu Gly Ala Lys Ile Glu Leu Ser Ile
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Leu

<210> 6
 <211> 1500
 <212> DNA
 <213> Pseudomonas sp.

<222> (34) .. (1380)

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Met Ser His Ser Ala Ser Pro
1 5

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Lys Pro Ala Thr Ala Arg Arg Ser Glu Ala Leu Thr Gly Glu Ile Arg
      10              15              20

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Ile Pro Gly Asp Lys Ser Ile Ser His Arg Ser Phe Met Phe Gly Gly
25 30 35

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Leu Ala Ser Gly Glu Thr Arg Ile Thr Gly Leu Leu Glu Gly Glu Asp
40 45 50 55

gtc atc aat aca ggc cgc gcc atg cag gcc atg ggc gcg aaa atc cgt 246
Val Ile Asn Thr Gly Arg Ala Met Gln Ala Met Gly Ala Lys Ile Arg
60 65 70

aaa gag ggc gat gtc tgg atc atc aac ggc gtc ggc aat ggc tgc ctg 294
Lys Glu Gly Asp Val Trp Ile Ile Asn Gly Val Gly Asn Gly Cys Leu
75 80 85

| | | | | | | | | | | | | | | | | |
|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|
| ttg | cag | ccc | gaa | gct | gcg | ctc | gat | ttc | ggc | aat | gcc | gga | acc | ggc | gcg | 342 |
| Leu | Gln | Pro | Glu | Ala | Ala | Leu | Asp | Phe | Gly | Asn | Ala | Gly | Thr | Gly | Ala | |
| | | 90 | | | | | 95 | | | | | 100 | | | | |

cgc ctc acc atg ggc ctt gtc ggc acc tat gac atg aag acc tcc ttt 390
Arg Leu Thr Met Gly Leu Val Gly Thr Tyr Asp Met Lys Thr Ser Phe
105 110 115

atc ggc gac gcc tcg ctg tcg aag cgc ccg atg ggc cgc gtg ctg aac 438
Ile Gly Asp Ala Ser Leu Ser Lys Arg Pro Met Gly Arg Val Leu Asn
120 125 130 135

cgc ttg cgc gaa atg ggc gtt cag gtg gaa gca gcc gat ggc gac cgc 486
Pro Leu Arg Glu Met Gly Val Gln Val Glu Ala Ala Asp Gly Asp Arg
140 145 150

atg ccg ctg acg ctg atc ggc ccg aag acg gcc aat ccg atc acc tat 534
Met Pro Leu Thr Leu Ile Gly Pro Lys Thr Ala Asn Pro Ile Thr Tyr
155 160 165

cgc gtg ccg atg gcc tcc gcg cag gta aaa tcc gcc gtg ctg ctc gcc 582
Arg Val Pro Met Ala Ser Ala Gln Val Lys Ser Ala Val Leu Leu Ala
170 175 180

| | |
|---|------|
| ggt ctc aac acg ccg ggc gtc acc acc gtc atc gag ccg gtc atg acc | 630 |
| Gly Leu Asn Thr Pro Gly Val Thr Thr Val Ile Glu Pro Val Met Thr | |
| 185 190 195 | |
| cgc gac cac acc gaa aag atg ctg cag ggc ttt ggc gcc gac ctc acg | 678 |
| Arg Asp His Thr Glu Lys Met Leu Gln Gly Phe Gly Ala Asp Leu Thr | |
| 200 205 210 215 | |
| gtc gag acc gac aag gat ggc gtg cgc cat atc cgc atc acc ggc cag | 726 |
| Val Glu Thr Asp Lys Asp Gly Val Arg His Ile Arg Ile Thr Gly Gln | |
| 220 225 230 | |
| ggc aag ctt gtc ggc cag acc atc gac gtg ccg ggc gat ccg tca tcg | 774 |
| Gly Lys Leu Val Gly Gln Thr Ile Asp Val Pro Gly Asp Pro Ser Ser | |
| 235 240 245 | |
| acc gcc ttc ccg ctc gtt gcc gcc ctt ctg gtg gaa ggt tcc gac gtc | 822 |
| Thr Ala Phe Pro Leu Val Ala Ala Leu Leu Val Glu Gly Ser Asp Val | |
| 250 255 260 | |
| acc atc cgc aac gtg ctg atg aac ccg acc cgt acc ggc ctc atc ctc | 870 |
| Thr Ile Arg Asn Val Leu Met Asn Pro Thr Arg Thr Gly Leu Ile Leu | |
| 265 270 275 | |
| acc ttg cag gaa atg ggc gcc gat atc gaa gtg ctc aat gcc cgt ctt | 918 |
| Thr Leu Gln Glu Met Gly Ala Asp Ile Glu Val Leu Asn Ala Arg Leu | |
| 280 285 290 295 | |
| gca ggc ggc gaa gac gtc gcc gat ctg cgc gtc agg gct tcg aag ctc | 966 |
| Ala Gly Gly Glu Asp Val Ala Asp Leu Arg Val Arg Ala Ser Lys Leu | |
| 300 305 310 | |
| aag ggc gtc gtc gtt ccg ccg gaa cgt gcg ccg tcg atg atc gac gaa | 1014 |
| Lys Gly Val Val Val Pro Pro Glu Arg Ala Pro Ser Met Ile Asp Glu | |
| 315 320 325 | |
| tat ccg gtc ctg gcg att gcc gcc tcc ttc gcg gaa ggc gaa acc gtg | 1062 |
| Tyr Pro Val Leu Ala Ile Ala Ala Ser Phe Ala Glu Gly Glu Thr Val | |
| 330 335 340 | |
| atg gac ggg ctc gac gaa ctg cgc gtc aag gaa tcg gat cgt ctg gca | 1110 |
| Met Asp Gly Leu Asp Glu Leu Arg Val Lys Glu Ser Asp Arg Leu Ala | |
| 345 350 355 | |
| gcg gtc gca cgc ggc ctt gaa gcc aac ggc gtc gat tgc acc gaa ggc | 1158 |
| Ala Val Ala Arg Gly Leu Glu Ala Asn Gly Val Asp Cys Thr Glu Gly | |
| 360 365 370 375 | |
| gag atg tcg ctg acg gtt cgc ggc cgc ccc gac ggc aag gga ctg ggc | 1206 |
| Glu Met Ser Leu Thr Val Arg Gly Arg Pro Asp Gly Lys Gly Leu Gly | |
| 380 385 390 | |
| ggc ggc acg gtt gca acc cat ctc gat cat cgt atc gcg atg agc ttc | 1254 |
| Gly Gly Thr Val Ala Thr His Leu Asp His Arg Ile Ala Met Ser Phe | |

| 395 | 400 | 405 | |
|---|-----|-----|------|
| ctc gtg atg ggc ctt gcg gcg gaa aag ccg gtg acg gtt gac gac agt | | | 1302 |
| Leu Val Met Gly Leu Ala Ala Glu Lys Pro Val Thr Val Asp Asp Ser | | | |
| 410 | 415 | 420 | |
| aac atg atc gcc acg tcc ttc ccc gaa ttc atg gac atg atg ccg gga | | | 1350 |
| Asn Met Ile Ala Thr Ser Phe Pro Glu Phe Met Asp Met Met Pro Gly | | | |
| 425 | 430 | 435 | |
| ttg ggc gca aag atc gag ttg agc ata ctc tagtcactcg acagcgaaaa | | | 1400 |
| Leu Gly Ala Lys Ile Glu Leu Ser Ile Leu | | | |
| 440 | 445 | | |
| tattattttgc gagattgggc attattaccg gttggtctca gcggggggttt aatgtccaat | | | 1460 |
| cttccatacg taacagcatc aggaaatata aaaaaagctt | | | 1500 |

<210> 7
 <211> 449
 <212> PRT
 <213> Pseudomonas sp.

<400> 7

| |
|---|
| Met Ser His Ser Ala Ser Pro Lys Pro Ala Thr Ala Arg Arg Ser Glu |
| 1 5 10 15 |

| |
|---|
| Ala Leu Thr Gly Glu Ile Arg Ile Pro Gly Asp Lys Ser Ile Ser His |
| 20 25 30 |

| |
|---|
| Arg Ser Phe Met Phe Gly Gly Leu Ala Ser Gly Glu Thr Arg Ile Thr |
| 35 40 45 |

| |
|---|
| Gly Leu Leu Glu Gly Glu Asp Val Ile Asn Thr Gly Arg Ala Met Gln |
| 50 55 60 |

| |
|---|
| Ala Met Gly Ala Lys Ile Arg Lys Glu Gly Asp Val Trp Ile Ile Asn |
| 65 70 75 80 |

| |
|---|
| Gly Val Gly Asn Gly Cys Leu Leu Gln Pro Glu Ala Ala Leu Asp Phe |
| 85 90 95 |

| |
|---|
| Gly Asn Ala Gly Thr Gly Ala Arg Leu Thr Met Gly Leu Val Gly Thr |
| 100 105 110 |

121

F

Tyr Asp Met Lys Thr Ser Phe Ile Gly Asp Ala Ser Leu Ser Lys Arg
115 120 125

Pro Met Gly Arg Val Leu Asn Pro Leu Arg Glu Met Gly Val Gln Val
130 135 140

Glu Ala Ala Asp Gly Asp Arg Met Pro Leu Thr Leu Ile Gly Pro Lys
145 150 155 160

Thr Ala Asn Pro Ile Thr Tyr Arg Val Pro Met Ala Ser Ala Gln Val
165 170 175

Lys Ser Ala Val Leu Leu Ala Gly Leu Asn Thr Pro Gly Val Thr Thr
180 185 190

Val Ile Glu Pro Val Met Thr Arg Asp His Thr Glu Lys Met Leu Gln
195 200 205

Gly Phe Gly Ala Asp Leu Thr Val Glu Thr Asp Lys Asp Gly Val Arg
210 215 220

His Ile Arg Ile Thr Gly Gln Gly Lys Leu Val Gly Gln Thr Ile Asp
225 230 235 240

Val Pro Gly Asp Pro Ser Ser Thr Ala Phe Pro Leu Val Ala Ala Leu
245 250 255

Leu Val Glu Gly Ser Asp Val Thr Ile Arg Asn Val Leu Met Asn Pro
260 265 270

Thr Arg Thr Gly Leu Ile Leu Thr Leu Gln Glu Met Gly Ala Asp Ile
275 280 285

Glu Val Leu Asn Ala Arg Leu Ala Gly Gly Glu Asp Val Ala Asp Leu
290 295 300

Arg Val Arg Ala Ser Lys Leu Lys Gly Val Val Val Pro Pro Glu Arg
305 310 315 320

Ala Pro Ser Met Ile Asp Glu Tyr Pro Val Leu Ala Ile Ala Ala Ser
325 330 335

Phe Ala Glu Gly Glu Thr Val Met Asp Gly Leu Asp Glu Leu Arg Val
 340 345 350

Lys Glu Ser Asp Arg Leu Ala Ala Val Ala Arg Gly Leu Glu Ala Asn
 355 360 365

Gly Val Asp Cys Thr Glu Gly Glu Met Ser Leu Thr Val Arg Gly Arg
 370 375 380

Pro Asp Gly Lys Gly Leu Gly Gly Gly Thr Val Ala Thr His Leu Asp
 385 390 395 400

His Arg Ile Ala Met Ser Phe Leu Val Met Gly Leu Ala Ala Glu Lys
 405 410 415

Pro Val Thr Val Asp Asp Ser Asn Met Ile Ala Thr Ser Phe Pro Glu
 420 425 430

Phe Met Asp Met Met Pro Gly Leu Gly Ala Lys Ile Glu Leu Ser Ile
 435 440 445

Leu

<210> 8
 <211> 423
 <212> PRT
 <213> Escherichia coli

<400> 8

Ser Leu Thr Leu Gln Pro Ile Ala Arg Val Asp Gly Thr Ile Asn Leu
 1 5 10 15

Pro Gly Ser Lys Thr Val Ser Asn Arg Ala Leu Leu Leu Ala Ala Leu
 20 25 30

Ala His Gly Lys Thr Val Leu Thr Asn Leu Leu Asp Ser Asp Asp Val
 35 40 45

Arg His Met Leu Asn Ala Leu Thr Ala Leu Gly Val Ser Tyr Thr Leu
 50 55 60

Ser Ala Asp Arg Thr Arg Cys Glu Ile Ile Gly Asn Gly Gly Pro Leu

| | | | | | | | | | | | | | | | |
|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|
| 65 | | | | | 70 | | | | | | 75 | | | | 80 |
| His | Ala | Glu | Gly | Ala | Leu | Glu | Leu | Phe | Leu | Gly | Asn | Ala | Gly | Thr | Ala |
| | | | | 85 | | | | | 90 | | | | | 95 | |
| Met | Arg | Pro | Leu | Ala | Ala | Ala | Leu | Cys | Leu | Gly | Ser | Asn | Asp | Ile | Val |
| | | | 100 | | | | | 105 | | | | | 110 | | |
| Leu | Thr | Gly | Glu | Pro | Arg | Met | Lys | Glu | Arg | Pro | Ile | Gly | His | Leu | Val |
| | | 115 | | | | | 120 | | | | | 125 | | | |
| Asp | Ala | Leu | Arg | Leu | Gly | Gly | Ala | Lys | Ile | Thr | Tyr | Leu | Glu | Gln | Glu |
| | 130 | | | | | 135 | | | | | 140 | | | | |
| Asn | Tyr | Pro | Pro | Leu | Arg | Leu | Gln | Gly | Gly | Phe | Thr | Gly | Gly | Asn | Val |
| 145 | | | | | 150 | | | | | 155 | | | | 160 | |
| Asp | Val | Asp | Gly | Ser | Val | Ser | Ser | Gln | Phe | Leu | Thr | Ala | Leu | Leu | Met |
| | | | | 165 | | | | | 170 | | | | | 175 | |
| Thr | Ala | Pro | Leu | Ala | Pro | Glu | Asp | Thr | Val | Ile | Arg | Ile | Lys | Gly | Asp |
| | | | 180 | | | | | 185 | | | | | 190 | | |
| Leu | Val | Ser | Lys | Pro | Tyr | Ile | Asp | Ile | Thr | Leu | Asn | Leu | Met | Lys | Thr |
| | | 195 | | | | | 200 | | | | | 205 | | | |
| Phe | Gly | Val | Glu | Ile | Glu | Asn | Gln | His | Tyr | Gln | Gln | Phe | Val | Val | Lys |
| | 210 | | | | | 215 | | | | | 220 | | | | |
| Gly | Gly | Gln | Ser | Tyr | Gln | Ser | Pro | Gly | Thr | Tyr | Leu | Val | Glu | Gly | Asp |
| 225 | | | | | 230 | | | | | 235 | | | | | 240 |
| Ala | Ser | Ser | Ala | Ser | Tyr | Phe | Leu | Ala | Ala | Ala | Ala | Ile | Lys | Gly | Gly |
| | | | | 245 | | | | | 250 | | | | | 255 | |
| Thr | Val | Lys | Val | Thr | Gly | Ile | Gly | Arg | Asn | Ser | Met | Gln | Gly | Asp | Ile |
| | | | 260 | | | | | 265 | | | | | 270 | | |
| Arg | Phe | Ala | Asp | Val | Leu | Glu | Lys | Met | Gly | Ala | Thr | Ile | Cys | Trp | Gly |
| | | 275 | | | | | 280 | | | | | 285 | | | |
| Asp | Asp | Tyr | Ile | Ser | Cys | Thr | Arg | Gly | Glu | Leu | Asn | Ala | Ile | Asp | Met |
| | 290 | | | | | 295 | | | | | 300 | | | | |
| Asp | Met | Asn | His | Ile | Pro | Asp | Ala | Ala | Met | Thr | Ile | Ala | Thr | Ala | Ala |
| 305 | | | | | 310 | | | | | 315 | | | | 320 | |
| Leu | Phe | Ala | Lys | Gly | Thr | Thr | Arg | Leu | Arg | Asn | Ile | Tyr | Asn | Trp | Arg |
| | | | | 325 | | | | | 330 | | | | | 335 | |
| Val | Lys | Glu | Thr | Asp | Arg | Leu | Phe | Ala | Met | Ala | Thr | Glu | Leu | Arg | Lys |
| | | | 340 | | | | | 345 | | | | | 350 | | |
| Val | Gly | Ala | Glu | Val | Glu | Glu | Gly | His | Asp | Tyr | Ile | Arg | Ile | Thr | Pro |

355

360

365

Pro Glu Lys Leu Asn Phe Ala Glu Ile Ala Thr Tyr Asn Asp His Arg
 370 375 380

Met Ala Met Cys Phe Ser Leu Val Ala Leu Ser Asp Thr Pro Val Thr
 385 390 395 400

Ile Leu Asp Pro Lys Cys Thr Ala Lys Thr Phe Pro Asp Tyr Phe Glu
 405 410 415

Gln Leu Ala Arg Ile Ser Gln
 420

<210> 9

<211> 1377

<212> DNA

<213> Artificial sequence

<220>

<223> Synthetic

<400> 9

ccatggctca cgggtgcaagc agccgtccag caactgctcg taagtcctct ggtctttctg 60
 gaaccgtccg tattccaggt gacaagtcta tctcccacag gtccttcatg tttggaggtc 120
 tcgctagcgg tgaaactcgt atcacccggtc ttttggaagg tgaagatggt atcaacactg 180
 gtaaggctat gcaagctatg ggtgccagaa tccgtaagga aggtgatact tggatcattg 240
 atgggtgttg taacgggtgga ctccttgctc ctgaggctcc tctcgatttc ggtaacgctg 300
 caactggttg ccgtttgact atgggtcttg ttgggtgttta cgatttcgat agcactttca 360
 ttgggtgaagc ttctctcact aagcgtccaa tgggtcgtgt gttgaacca cttcgcgaaa 420
 tgggtgtgca ggtgaagtct gaagacgggtg atcgtcttcc agttacctg cgtggaccaa 480
 agactccaac gccaatcacc tacagggtac ctatggcttc cgctcaagtg aagtcgcgtg 540
 ttctgcttgc tgggtctcaac accccaggta tcaccactgt tatcgagcca atcatgactc 600
 gtgaccacac tgaaaagatg cttcaagggt ttgggtgctaa ccttaccgtt gagactgatg 660
 ctgacgggtg gcgtaccatc cgtcttgaag gtcgtggtaa gctcaccggt caagtgattg 720
 atgttccagg tgatccatcc tctactgctt tcccattggt tgctgccttg cttgttccag 780
 gttccgacgt caccatcctt aacgttttga tgaaccaaac ccgtactggg ctcactttga 840
 ctctgcagga aatgggtgcc gacatcgaag tgatcaaccc acgtcttgct ggtggagaag 900
 acgtggctga cttgcgtggt cgttcttcta ctttgaaggg tgttactggt ccagaagacc 960

gtgctccttc tatgatcgac gagtatccaa ttctcgctgt tgcagctgca ttcgctgaag 1020
 gtgctaccgt tatgaacggt ttggaagaac tccgtgttaa ggaaagcgac cgtctttctg 1080
 ctgtcgcaaaa cgggtctcaag ctcaacggtg ttgattgcga tgaaggtgag acttctctcg 1140
 tcgtgcgtgg tcgtcctgac ggtaagggtc tcggtaacgc ttctggagca gctgtcgtc 1200
 cccacctcga tcaccgtatc gctatgagct tcctcgttat gggctctcgtt tctgaaaacc 1260
 ctgttactgt tgatgatgct actatgatcg ctactagctt cccagagttc atggatttga 1320
 tggctggtct tggagctaag atcgaactct ccgacactaa ggctgcttga tgagctc 1377

<210> 10
 <211> 318
 <212> DNA
 <213> Arabidopsis thaliana

<220>
 <221> CDS
 <222> (87)..(317)

<400> 10
 agatctatcg ataagcttga tgtaattgga ggaagatcaa aattttcaat cccattctt 60
 cgattgcttc aattgaagtt tctccg atg gcg caa gtt agc aga atc tgc aat 113
 Met Ala Gln Val Ser Arg Ile Cys Asn
 1 5
 ggt gtg cag aac cca tct ctt atc tcc aat ctg tgc aaa tcc agt caa 161
 Gly Val Gln Asn Pro Ser Leu Ile Ser Asn Leu Ser Lys Ser Ser Gln
 10 15 20 25
 cgc aaa tct ccc tta tgc gtt tct ctg aag acg cag cag cat cca cga 209
 Arg Lys Ser Pro Leu Ser Val Ser Leu Lys Thr Gln Gln His Pro Arg
 30 35 40
 gct tat ccg att tgc tgc tgc tgg gga ttg aag aag agt ggg atg acg 257
 Ala Tyr Pro Ile Ser Ser Ser Trp Gly Leu Lys Lys Ser Gly Met Thr
 45 50 55
 tta att ggc tct gag ctt cgt cct ctt aag gtc atg tct tct gtt tcc 305
 Leu Ile Gly Ser Glu Leu Arg Pro Leu Lys Val Met Ser Ser Val Ser
 60 65 70
 acg gcg tgc atg c 318
 Thr Ala Cys Met
 75

<210> 11

<211> 77
 <212> PRT
 <213> Arabidopsis thaliana

<400> 11

Met Ala Gln Val Ser Arg Ile Cys Asn Gly Val Gln Asn Pro Ser Leu
 1 5 10 15

Ile Ser Asn Leu Ser Lys Ser Ser Gln Arg Lys Ser Pro Leu Ser Val
 20 25 30

Ser Leu Lys Thr Gln Gln His Pro Arg Ala Tyr Pro Ile Ser Ser Ser
 35 40 45

Trp Gly Leu Lys Lys Ser Gly Met Thr Leu Ile Gly Ser Glu Leu Arg
 50 55 60

Pro Leu Lys Val Met Ser Ser Val Ser Thr Ala Cys Met
 65 70 75

<210> 12
 <211> 402
 <212> DNA
 <213> Arabidopsis thaliana

<220>
 <221> CDS
 <222> (87) .. (401)

<400> 12

agatctatcg ataagcttga tgtaattgga ggaagatcaa aattttcaat cccattctt 60

cgattgcttc aattgaagtt tctccg atg gcg caa gtt agc aga atc tgc aat 113
 Met Ala Gln Val Ser Arg Ile Cys Asn
 1 5

ggt gtg cag aac cca tct ctt atc tcc aat ctc tcg aaa tcc agt caa 161
 Gly Val Gln Asn Pro Ser Leu Ile Ser Asn Leu Ser Lys Ser Ser Gln
 10 15 20 25

cgc aaa tct ccc tta tcg gtt tct ctg aag acg cag cag cat cca cga 209
 Arg Lys Ser Pro Leu Ser Val Ser Leu Lys Thr Gln Gln His Pro Arg
 30 35 40

gct tat ccg att tcg tcg tcg tgg gga ttg aag aag agt ggg atg acg 257
 Ala Tyr Pro Ile Ser Ser Ser Trp Gly Leu Lys Lys Ser Gly Met Thr
 45 50 55

tta att ggc tct gag ctt cgt cct ctt aag gtc atg tct tct gtt tcc 305
 Leu Ile Gly Ser Glu Leu Arg Pro Leu Lys Val Met Ser Ser Val Ser
 60 65 70

acg gcg gag aaa gcg tcg gag att gta ctt caa ccc att aga gaa atc 353
 Thr Ala Glu Lys Ala Ser Glu Ile Val Leu Gln Pro Ile Arg Glu Ile
 75 80 85

tcc ggt ctt att aag ttg cct ggc tcc aag tct cta tca aat aga att c 402
 Ser Gly Leu Ile Lys Leu Pro Gly Ser Lys Ser Leu Ser Asn Arg Ile
 90 95 100 105

<210> 13
 <211> 105
 <212> PRT
 <213> Arabidopsis thaliana

<400> 13

Met Ala Gln Val Ser Arg Ile Cys Asn Gly Val Gln Asn Pro Ser Leu
 1 5 10 15

Ile Ser Asn Leu Ser Lys Ser Ser Gln Arg Lys Ser Pro Leu Ser Val
 20 25 30

Ser Leu Lys Thr Gln Gln His Pro Arg Ala Tyr Pro Ile Ser Ser Ser
 35 40 45

Trp Gly Leu Lys Lys Ser Gly Met Thr Leu Ile Gly Ser Glu Leu Arg
 50 55 60

Pro Leu Lys Val Met Ser Ser Val Ser Thr Ala Glu Lys Ala Ser Glu
 65 70 75 80

Ile Val Leu Gln Pro Ile Arg Glu Ile Ser Gly Leu Ile Lys Leu Pro
 85 90 95

Gly Ser Lys Ser Leu Ser Asn Arg Ile
 100 105

<210> 14
 <211> 233
 <212> DNA
 <213> Petunia x hybrida

<220>

<221> CDS

<222> (14)..(232)

<400> 14

agatctttca aga atg gca caa att aac aac atg gct caa ggg ata caa 49
Met Ala Gln Ile Asn Asn Met Ala Gln Gly Ile Gln
1 5 10

acc ctt aat ccc aat tcc aat ttc cat aaa ccc caa gtt cct aaa tct 97
Thr Leu Asn Pro Asn Ser Asn Phe His Lys Pro Gln Val Pro Lys Ser
15 20 25

tca agt ttt ctt gtt ttt gga tct aaa aaa ctg aaa aat tca gca aat 145
Ser Ser Phe Leu Val Phe Gly Ser Lys Lys Leu Lys Asn Ser Ala Asn
30 35 40

tct atg ttg gtt ttg aaa aaa gat tca att ttt atg caa aag ttt tgt 193
Ser Met Leu Val Leu Lys Lys Asp Ser Ile Phe Met Gln Lys Phe Cys
45 50 55 60

tcc ttt agg att tca gca tca gtg gct aca gcc tgc atg c 233
Ser Phe Arg Ile Ser Ala Ser Val Ala Thr Ala Cys Met
65 70

<210> 15

<211> 73

<212> PRT

<213> Petunia x hybrida

<400> 15

Met Ala Gln Ile Asn Asn Met Ala Gln Gly Ile Gln Thr Leu Asn Pro
1 5 10 15

Asn Ser Asn Phe His Lys Pro Gln Val Pro Lys Ser Ser Ser Phe Leu
20 25 30

Val Phe Gly Ser Lys Lys Leu Lys Asn Ser Ala Asn Ser Met Leu Val
35 40 45

Leu Lys Lys Asp Ser Ile Phe Met Gln Lys Phe Cys Ser Phe Arg Ile
50 55 60

Ser Ala Ser Val Ala Thr Ala Cys Met
65 70

<210> 16

<211> 352

<212> DNA
<213> Petunia x hybrida

<220>
<221> CDS
<222> (49)..(351)

<400> 16
agatctgcta gaaataattt tgtttaactt taagaaggag atatatcc atg gca caa 57
Met Ala Gln
1

att aac aac atg gct caa ggg ata caa acc ctt aat ccc aat tcc aat 105
Ile Asn Asn Met Ala Gln Gly Ile Gln Thr Leu Asn Pro Asn Ser Asn
5 10 15

ttc cat aaa ccc caa gtt cct aaa tct tca agt ttt ctt gtt ttt gga 153
Phe His Lys Pro Gln Val Pro Lys Ser Ser Ser Phe Leu Val Phe Gly
20 25 30 35

tct aaa aaa ctg aaa aat tca gca aat tct atg ttg gtt ttg aaa aaa 201
Ser Lys Lys Leu Lys Asn Ser Ala Asn Ser Met Leu Val Leu Lys Lys
40 45 50

gat tca att ttt atg caa aag ttt tgt tcc ttt agg att tca gca tca 249
Asp Ser Ile Phe Met Gln Lys Phe Cys Ser Phe Arg Ile Ser Ala Ser
55 60 65

gtg gct aca gca cag aag cct tct gag ata gtg ttg caa ccc att aaa 297
Val Ala Thr Ala Gln Lys Pro Ser Glu Ile Val Leu Gln Pro Ile Lys
70 75 80

gag att tca ggc act gtt aaa ttg cct ggc tct aaa tca tta tct aat 345
Glu Ile Ser Gly Thr Val Lys Leu Pro Gly Ser Lys Ser Leu Ser Asn
85 90 95

aga att c 352
Arg Ile
100

<210> 17
<211> 101
<212> PRT
<213> Petunia x hybrida

<400> 17

Met Ala Gln Ile Asn Asn Met Ala Gln Gly Ile Gln Thr Leu Asn Pro
1 5 10 15

Asn Ser Asn Phe His Lys Pro Gln Val Pro Lys Ser Ser Ser Phe Leu
20 25 30

130

F

Val Phe Gly Ser Lys Lys Leu Lys Asn Ser Ala Asn Ser Met Leu Val
 35 40 45

Leu Lys Lys Asp Ser Ile Phe Met Gln Lys Phe Cys Ser Phe Arg Ile
 50 55 60

Ser Ala Ser Val Ala Thr Ala Gln Lys Pro Ser Glu Ile Val Leu Gln
 65 70 75 80

Pro Ile Lys Glu Ile Ser Gly Thr Val Lys Leu Pro Gly Ser Lys Ser
 85 90 95

Leu Ser Asn Arg Ile
 100

<210> 18
 <211> 28
 <212> PRT
 <213> Agrobacterium sp.

<220>
 <221> UNSURE
 <222> (1)..(18)
 <223> Xaa = Unknown

<400> 18

Xaa His Gly Ala Ser Ser Arg Pro Ala Thr Ala Arg Lys Ser Ser Gly
 1 5 10 15

Leu Xaa Gly Thr Val Arg Ile Pro Gly Asp Lys Met
 20 25

<210> 19
 <211> 13
 <212> PRT
 <213> Agrobacterium sp.

<400> 19

Ala Pro Ser Met Ile Asp Glu Tyr Pro Ile Leu Ala Val
 1 5 10

<210> 20
 <211> 15
 <212> PRT

<213> Agrobacterium sp.

<400> 20

Ile Thr Gly Leu Leu Glu Gly Glu Asp Val Ile Asn Thr Gly Lys
1 5 10 15

<210> 21

<211> 17

<212> DNA

<213> Artificial sequence

<220>

<223> Synthetic

<400> 21

atgathgayg artaycc

17

<210> 22

<211> 17

<212> DNA

<213> Artificial sequence

<220>

<223> Synthetic

<220>

<221> misc_feature

<222> (1)..(17)

<223> R = A or G;

Y = C or T/U;

N = A or C or G or T/U;

H = A or C or T/U

<400> 22

gargaygtna thaacac

17

<210> 23

<211> 17

<212> DNA

<213> Artificial sequence

<220>

<223> Synthetic

<220>

<221> misc_feature

<222> (1)..(17)

<223> R = A or G;

Y = C or T/U;

N = A or C or G or T/U;

132

F

H = A or C or T/U

<400> 23
gargaygtna thaatac 17

<210> 24
<211> 38
<212> DNA
<213> Artificial sequence

<220>
<223> Oligonucleotide

<400> 24
cgtggataga tctaggaaga caaccatggc tcacggtc 38

<210> 25
<211> 44
<212> DNA
<213> Artificial sequence

<220>
<223> Oligonucleotide

<400> 25
ggatagatta aggaagacgc gcatgcttca cgggtgcaagc agcc 44

<210> 26
<211> 35
<212> DNA
<213> Artificial sequence

<220>
<223> Oligonucleotide

<400> 26
ggctgcctga tgagctccac aatcgccatc gatgg 35

<210> 27
<211> 32
<212> DNA
<213> Artificial sequence

<220>
<223> Oligonucleotide

<400> 27
cgtcgctcgt cgtgcgtggc cgccctgacg gc 32

<210> 28
<211> 29
<212> DNA
<213> Artificial sequence

<220>
<223> Oligonucleotide

<400> 28
cgggcaaggc catgcaggct atgggcgcc

29

<210> 29
<211> 31
<212> DNA
<213> Artificial sequence

<220>
<223> Oligonucleotide

<400> 29
cgggctgccg cctgactatg ggcctcgtcg g

31

<210> 30
<211> 15
<212> PRT
<213> Pseudomonas sp.

<220>
<221> NON_CONS
<222> (1)..(1)
<223> Xaa = unknown

<400> 30

| | | | | | | | | | | | | | | |
|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|
| Xaa | His | Ser | Ala | Ser | Pro | Lys | Pro | Ala | Thr | Ala | Arg | Arg | Ser | Glu |
| 1 | | | | 5 | | | | | 10 | | | | 15 | |

<210> 31
<211> 17
<212> DNA
<213> Artificial sequence

<220>
<223> Oligonucleotide

<220>
<221> misc_feature
<222> (1)..(17)
<223> B = C or G or T
S = G or C

134

F

Y = C or T

<400> 31
gcggtbgcsg gytts^gg

17

<210> 32
<211> 16
<212> PRT
<213> Artificial sequence

<220>
<223> Synthetic

<400> 32

| | | | | | | | | | | | | | | | |
|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|
| Pro | Gly | Asp | Lys | Ser | Ile | Ser | His | Arg | Ser | Phe | Met | Phe | Gly | Gly | Leu |
| 1 | | | | 5 | | | | 10 | | | | | 15 | | |

<210> 33
<211> 13
<212> PRT
<213> Artificial sequence

<220>
<223> Oligonucleotide

<400> 33

| | | | | | | | | | | | | |
|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|
| Leu | Asp | Phe | Gly | Asn | Ala | Ala | Thr | Gly | Cys | Arg | Leu | Thr |
| 1 | | | | 5 | | | | 10 | | | | |

<210> 34
<211> 26
<212> DNA
<213> Artificial sequence

<220>
<223> Oligonucleotide

<400> 34
cggcaatgcc gccaccggcg cgcgcc

26

<210> 35
<211> 49
<212> DNA
<213> Artificial sequence

<220>
<223> Oligonucleotide

<400> 35

135

F

ggacggctgc ttgcaccgtg aagcatgctt aagcttggcg taatcatgg

49

<210> 36
<211> 35
<212> DNA
<213> Artificial sequence

<220>
<223> Oligonucleotide

<400> 36
ggaagacgcc cagaattcac ggtgcaagca gccgg

35

<210> 37
<211> 5
<212> PRT
<213> Artificial sequence

<220>
<223> Synthetic

<220>
<221> NON_CONS
<222> (2)..(2)
<223> Xaa = Gly, Ser, Thr, Cys, Tyr, Asn, Gln, Asp, or Glu

<220>
<221> NON_CONS
<222> (4)..(4)
<223> Xaa = Ser or Thr

<400> 37

Arg Xaa His Xaa Glu
1 5

<210> 38
<211> 4
<212> PRT
<213> Artificial sequence

<220>
<223> Synthetic

<220>
<221> NON_CONS
<222> (4)..(4)
<223> Xaa = Ser or Thr

<400> 38

Gly Asp Lys Xaa

1

<210> 39

<211> 5

<212> PRT

<213> Artificial sequence

<220>

<223> Synthetic

<220>

<221> NON_CONS

<222> (4)..(4)

<223> Xaa=Ala, Arg, Asn, Asp, Cys, Gln, Glu, Gly, His, Ile, Leu, Lys,
Met, Phe, Pro, Ser, Thr, Trp, Tyr, or Val

<400> 39

Ser Ala Gln Xaa Lys

1

5

<210> 40

<211> 4

<212> PRT

<213> Artificial sequence

<220>

<223> Synthetic

<220>

<221> NON_CONS

<222> (2)..(2)

<223> Xaa=Ala, Arg, Asn, Asp, Cys, Gln, Glu, Gly, His, Ile, Leu, Lys,
Met,

Phe, Pro, Ser, Thr, Trp, Tyr or Val

<400> 40

Asn Xaa Thr Arg

1

<210> 41

<211> 1287

<212> DNA

<213> Bacillus subtilis

<220>

<221> CDS

<222> (1)..(1287)

137

A

<400> 41

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|---|-----|
| atg aaa cga gat aag gtg cag acc tta cat gga gaa ata cat att ccc | 48 |
| Met Lys Arg Asp Lys Val Gln Thr Leu His Gly Glu Ile His Ile Pro | |
| 1 5 10 15 | |
| ggg gat aaa tcc att tct cac cgc tct gtt atg ttt ggc gcg cta gcg | 96 |
| Gly Asp Lys Ser Ile Ser His Arg Ser Val Met Phe Gly Ala Leu Ala | |
| 20 25 30 | |
| gca ggc aca aca aca gtt aaa aac ttt ctg ccg gga gca gat tgt ctg | 144 |
| Ala Gly Thr Thr Thr Val Lys Asn Phe Leu Pro Gly Ala Asp Cys Leu | |
| 35 40 45 | |
| agc acg atc gat tgc ttt aga aaa atg ggt gtt cac att gag caa agc | 192 |
| Ser Thr Ile Asp Cys Phe Arg Lys Met Gly Val His Ile Glu Gln Ser | |
| 50 55 60 | |
| agc agc gat gtc gtg att cac gga aaa gga atc gat gcc ctg aaa gag | 240 |
| Ser Ser Asp Val Val Ile His Gly Lys Gly Ile Asp Ala Leu Lys Glu | |
| 65 70 75 80 | |
| cca gaa agc ctt tta gat gtc gga aat tca ggt aca acg att cgc ctg | 288 |
| Pro Glu Ser Leu Leu Asp Val Gly Asn Ser Gly Thr Thr Ile Arg Leu | |
| 85 90 95 | |
| atg ctc gga ata ttg gcg ggc cgt cct ttt tac agc gcg gta gcc gga | 336 |
| Met Leu Gly Ile Leu Ala Gly Arg Pro Phe Tyr Ser Ala Val Ala Gly | |
| 100 105 110 | |
| gat gag agc att gcg aaa cgc cca atg aag cgt gtg act gag cct ttg | 384 |
| Asp Glu Ser Ile Ala Lys Arg Pro Met Lys Arg Val Thr Glu Pro Leu | |
| 115 120 125 | |
| aaa aaa atg ggg gct aaa atc gac ggc aga gcc ggc gga gag ttt aca | 432 |
| Lys Lys Met Gly Ala Lys Ile Asp Gly Arg Ala Gly Gly Glu Phe Thr | |
| 130 135 140 | |
| ccg ctg tca gtg agc ggc gct tca tta aaa gga att gat tat gta tca | 480 |
| Pro Leu Ser Val Ser Gly Ala Ser Leu Lys Gly Ile Asp Tyr Val Ser | |
| 145 150 155 160 | |
| cct gtt gca agc gcg caa att aaa tct gct gtt ttg ctg gcc gga tta | 528 |
| Pro Val Ala Ser Ala Gln Ile Lys Ser Ala Val Leu Leu Ala Gly Leu | |
| 165 170 175 | |
| cag gct gag ggc aca aca act gta aca gag ccc cat aaa tct cgg gac | 576 |
| Gln Ala Glu Gly Thr Thr Thr Val Thr Glu Pro His Lys Ser Arg Asp | |
| 180 185 190 | |
| cac act gag cgg atg ctt tct gct ttt ggc gtt aag ctt tct gaa gat | 624 |
| His Thr Glu Arg Met Leu Ser Ala Phe Gly Val Lys Leu Ser Glu Asp | |
| 195 200 205 | |

| | |
|---|------|
| caa acg agt gtt tcc att gct ggt ggc cag aaa ctg aca gct gct gat | 672 |
| Gln Thr Ser Val Ser Ile Ala Gly Gly Gln Lys Leu Thr Ala Ala Asp | |
| 210 215 220 | |
| att ttt gtt cct gga gac att tct tca gcc gcg ttt ttc ctt gct gct | 720 |
| Ile Phe Val Pro Gly Asp Ile Ser Ser Ala Ala Phe Phe Leu Ala Ala | |
| 225 230 235 240 | |
| ggc gcg atg gtt cca aac agc aga att gta ttg aaa aac gta ggt tta | 768 |
| Gly Ala Met Val Pro Asn Ser Arg Ile Val Leu Lys Asn Val Gly Leu | |
| 245 250 255 | |
| aat ccg act cgg aca ggt att att gat gtc ctt caa aac atg ggg gca | 816 |
| Asn Pro Thr Arg Thr Gly Ile Ile Asp Val Leu Gln Asn Met Gly Ala | |
| 260 265 270 | |
| aaa ctt gaa atc aaa cca tct gct gat agc ggt gca gag cct tat gga | 864 |
| Lys Leu Glu Ile Lys Pro Ser Ala Asp Ser Gly Ala Glu Pro Tyr Gly | |
| 275 280 285 | |
| gat ttg att ata gaa acg tca tct cta aag gca gtt gaa atc gga gga | 912 |
| Asp Leu Ile Ile Glu Thr Ser Ser Leu Lys Ala Val Glu Ile Gly Gly | |
| 290 295 300 | |
| gat atc att ccg cgt tta att gat gag atc cct atc atc gcg ctt ctt | 960 |
| Asp Ile Ile Pro Arg Leu Ile Asp Glu Ile Pro Ile Ile Ala Leu Leu | |
| 305 310 315 320 | |
| gcg act cag gcg gaa gga acc acc gtt att aag gac gcg gca gag cta | 1008 |
| Ala Thr Gln Ala Glu Gly Thr Thr Val Ile Lys Asp Ala Ala Glu Leu | |
| 325 330 335 | |
| aaa gtg aaa gaa aca aac cgt att gat act gtt gtt tct gag ctt cgc | 1056 |
| Lys Val Lys Glu Thr Asn Arg Ile Asp Thr Val Val Ser Glu Leu Arg | |
| 340 345 350 | |
| aag ctg ggt gct gaa att gaa ccg aca gca gat gga atg aag gtt tat | 1104 |
| Lys Leu Gly Ala Glu Ile Glu Pro Thr Ala Asp Gly Met Lys Val Tyr | |
| 355 360 365 | |
| ggc aaa caa acg ttg aaa ggc ggc gct gca gtg tcc agc cac gga gat | 1152 |
| Gly Lys Gln Thr Leu Lys Gly Gly Ala Ala Val Ser Ser His Gly Asp | |
| 370 375 380 | |
| cat cga atc gga atg atg ctt ggt att gct tcc tgt ata acg gag gag | 1200 |
| His Arg Ile Gly Met Met Leu Gly Ile Ala Ser Cys Ile Thr Glu Glu | |
| 385 390 395 400 | |
| ccg att gaa atc gag cac acg gat gcc att cac gtt tct tat cca acc | 1248 |
| Pro Ile Glu Ile Glu His Thr Asp Ala Ile His Val Ser Tyr Pro Thr | |
| 405 410 415 | |
| ttc ttc gag cat tta aat aag ctt tcg aaa aaa tcc tga | 1287 |
| Phe Phe Glu His Leu Asn Lys Leu Ser Lys Lys Ser | |

420

425

<210> 42
 <211> 428
 <212> PRT
 <213> Bacillus subtilis

<400> 42

Met Lys Arg Asp Lys Val Gln Thr Leu His Gly Glu Ile His Ile Pro
 1 5 10 15

Gly Asp Lys Ser Ile Ser His Arg Ser Val Met Phe Gly Ala Leu Ala
 20 25 30

Ala Gly Thr Thr Thr Val Lys Asn Phe Leu Pro Gly Ala Asp Cys Leu
 35 40 45

Ser Thr Ile Asp Cys Phe Arg Lys Met Gly Val His Ile Glu Gln Ser
 50 55 60

Ser Ser Asp Val Val Ile His Gly Lys Gly Ile Asp Ala Leu Lys Glu
 65 70 75 80

Pro Glu Ser Leu Leu Asp Val Gly Asn Ser Gly Thr Thr Ile Arg Leu
 85 90 95

Met Leu Gly Ile Leu Ala Gly Arg Pro Phe Tyr Ser Ala Val Ala Gly
 100 105 110

Asp Glu Ser Ile Ala Lys Arg Pro Met Lys Arg Val Thr Glu Pro Leu
 115 120 125

Lys Lys Met Gly Ala Lys Ile Asp Gly Arg Ala Gly Gly Glu Phe Thr
 130 135 140

Pro Leu Ser Val Ser Gly Ala Ser Leu Lys Gly Ile Asp Tyr Val Ser
 145 150 155 160

Pro Val Ala Ser Ala Gln Ile Lys Ser Ala Val Leu Leu Ala Gly Leu
 165 170 175

| | | | | | | | | | | | | | | | |
|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|
| Gln | Ala | Glu | Gly | Thr | Thr | Thr | Val | Thr | Glu | Pro | His | Lys | Ser | Arg | Asp |
| | | | 180 | | | | | 185 | | | | | 190 | | |
| His | Thr | Glu | Arg | Met | Leu | Ser | Ala | Phe | Gly | Val | Lys | Leu | Ser | Glu | Asp |
| | | 195 | | | | | 200 | | | | | 205 | | | |
| Gln | Thr | Ser | Val | Ser | Ile | Ala | Gly | Gly | Gln | Lys | Leu | Thr | Ala | Ala | Asp |
| | 210 | | | | | 215 | | | | | 220 | | | | |
| Ile | Phe | Val | Pro | Gly | Asp | Ile | Ser | Ser | Ala | Ala | Phe | Phe | Leu | Ala | Ala |
| 225 | | | | | 230 | | | | | 235 | | | | | 240 |
| Gly | Ala | Met | Val | Pro | Asn | Ser | Arg | Ile | Val | Leu | Lys | Asn | Val | Gly | Leu |
| | | | | 245 | | | | | 250 | | | | | 255 | |
| Asn | Pro | Thr | Arg | Thr | Gly | Ile | Ile | Asp | Val | Leu | Gln | Asn | Met | Gly | Ala |
| | | | 260 | | | | | 265 | | | | | 270 | | |
| Lys | Leu | Glu | Ile | Lys | Pro | Ser | Ala | Asp | Ser | Gly | Ala | Glu | Pro | Tyr | Gly |
| | | 275 | | | | | 280 | | | | | 285 | | | |
| Asp | Leu | Ile | Ile | Glu | Thr | Ser | Ser | Leu | Lys | Ala | Val | Glu | Ile | Gly | Gly |
| | 290 | | | | | 295 | | | | | 300 | | | | |
| Asp | Ile | Ile | Pro | Arg | Leu | Ile | Asp | Glu | Ile | Pro | Ile | Ile | Ala | Leu | Leu |
| 305 | | | | | 310 | | | | | 315 | | | | | 320 |
| Ala | Thr | Gln | Ala | Glu | Gly | Thr | Thr | Val | Ile | Lys | Asp | Ala | Ala | Glu | Leu |
| | | | | 325 | | | | | 330 | | | | | 335 | |
| Lys | Val | Lys | Glu | Thr | Asn | Arg | Ile | Asp | Thr | Val | Val | Ser | Glu | Leu | Arg |
| | | | 340 | | | | | 345 | | | | | 350 | | |
| Lys | Leu | Gly | Ala | Glu | Ile | Glu | Pro | Thr | Ala | Asp | Gly | Met | Lys | Val | Tyr |
| | | 355 | | | | | 360 | | | | | 365 | | | |
| Gly | Lys | Gln | Thr | Leu | Lys | Gly | Gly | Ala | Ala | Val | Ser | Ser | His | Gly | Asp |
| | 370 | | | | | 375 | | | | | 380 | | | | |
| His | Arg | Ile | Gly | Met | Met | Leu | Gly | Ile | Ala | Ser | Cys | Ile | Thr | Glu | Glu |
| 385 | | | | | 390 | | | | | 395 | | | | | 400 |

141

F

Pro Ile Glu Ile Glu His Thr Asp Ala Ile His Val Ser Tyr Pro Thr
 405 410 415

Phe Phe Glu His Leu Asn Lys Leu Ser Lys Lys Ser
 420 425

<210> 43
 <211> 1293
 <212> DNA
 <213> Staphylococcus aureus

<220>
 <221> CDS
 <222> (1)..(1293)

<400> 43
 atg gta aat gaa caa atc att gat att tca ggt ccg tta aag ggc gaa 48
 Met Val Asn Glu Gln Ile Ile Asp Ile Ser Gly Pro Leu Lys Gly Glu
 1 5 10 15
 ata gaa gtg ccg ggc gat aag tca atg aca cac cgt gca atc atg ttg 96
 Ile Glu Val Pro Gly Asp Lys Ser Met Thr His Arg Ala Ile Met Leu
 20 25 30
 gcg tcg cta gct gaa ggt gta tct act ata tat aag cca cta ctt ggc 144
 Ala Ser Leu Ala Glu Gly Val Ser Thr Ile Tyr Lys Pro Leu Leu Gly
 35 40 45
 gaa gat tgt cgt cgt acg atg gac att ttc cga cac tta ggt gta gaa 192
 Glu Asp Cys Arg Arg Thr Met Asp Ile Phe Arg His Leu Gly Val Glu
 50 55 60
 atc aaa gaa gat gat gaa aaa tta gtt gtg act tcc cca gga tat caa 240
 Ile Lys Glu Asp Asp Glu Lys Leu Val Val Thr Ser Pro Gly Tyr Gln
 65 70 75 80
 gtt aac acg cca cat caa gta ttg tat aca ggt aat tct ggt acg aca 288
 Val Asn Thr Pro His Gln Val Leu Tyr Thr Gly Asn Ser Gly Thr Thr
 85 90 95
 aca cga tta ttg gca ggt ttg tta agt ggt tta ggt aat gaa agt gtt 336
 Thr Arg Leu Leu Ala Gly Leu Leu Ser Gly Leu Gly Asn Glu Ser Val
 100 105 110
 ttg tct ggc gat gtt tca att ggt aaa agg cca atg gat cgt gtc ttg 384
 Leu Ser Gly Asp Val Ser Ile Gly Lys Arg Pro Met Asp Arg Val Leu
 115 120 125
 aga cca ttg aaa ctt atg gat gcg aat att gaa ggt att gaa gat aat 432
 Arg Pro Leu Lys Leu Met Asp Ala Asn Ile Glu Gly Ile Glu Asp Asn

142

F

| 130 | 135 | 140 | |
|---|-----|-----|------|
| tat aca cca tta att att aag cca tct gtc ata aaa ggt ata aat tat | | | 480 |
| Tyr Thr Pro Leu Ile Ile Lys Pro Ser Val Ile Lys Gly Ile Asn Tyr | | | |
| 145 | 150 | 155 | 160 |
| caa atg gaa gtt gca agt gca caa gta aaa agt gcc att tta ttt gca | | | 528 |
| Gln Met Glu Val Ala Ser Ala Gln Val Lys Ser Ala Ile Leu Phe Ala | | | |
| | 165 | 170 | 175 |
| agt ttg ttt tct aag gaa ccg acc atc att aaa gaa tta gat gta agt | | | 576 |
| Ser Leu Phe Ser Lys Glu Pro Thr Ile Ile Lys Glu Leu Asp Val Ser | | | |
| | 180 | 185 | 190 |
| cga aat cat act gag acg atg ttc aaa cat ttt aat att cca att gaa | | | 624 |
| Arg Asn His Thr Glu Thr Met Phe Lys His Phe Asn Ile Pro Ile Glu | | | |
| | 195 | 200 | 205 |
| gca gaa ggg tta tca att aat aca acc cct gaa gca att cga tac att | | | 672 |
| Ala Glu Gly Leu Ser Ile Asn Thr Thr Pro Glu Ala Ile Arg Tyr Ile | | | |
| | 210 | 215 | 220 |
| aaa cct gca gat ttt cat gtt cct ggc gat att tca tct gca gcg ttc | | | 720 |
| Lys Pro Ala Asp Phe His Val Pro Gly Asp Ile Ser Ser Ala Ala Phe | | | |
| | 225 | 230 | 235 |
| ttt att gtt gca gca ctt atc aca cca gga agt gat gta aca att cat | | | 768 |
| Phe Ile Val Ala Ala Leu Ile Thr Pro Gly Ser Asp Val Thr Ile His | | | |
| | 245 | 250 | 255 |
| aat gtt gga atc aat caa aca cgt tca ggt att att gat att gtt gaa | | | 816 |
| Asn Val Gly Ile Asn Gln Thr Arg Ser Gly Ile Ile Asp Ile Val Glu | | | |
| | 260 | 265 | 270 |
| aaa atg ggc ggt aat atc caa ctt ttc aat caa aca act ggt gct gaa | | | 864 |
| Lys Met Gly Gly Asn Ile Gln Leu Phe Asn Gln Thr Thr Gly Ala Glu | | | |
| | 275 | 280 | 285 |
| cct act gct tct att cgt att caa tac aca cca atg ctt caa cca ata | | | 912 |
| Pro Thr Ala Ser Ile Arg Ile Gln Tyr Thr Pro Met Leu Gln Pro Ile | | | |
| | 290 | 295 | 300 |
| aca atc gaa gga gaa tta gtt cca aaa gca att gat gaa ctg cct gta | | | 960 |
| Thr Ile Glu Gly Glu Leu Val Pro Lys Ala Ile Asp Glu Leu Pro Val | | | |
| | 305 | 310 | 315 |
| ata gca tta ctt tgt aca caa gca gtt ggc acg agt aca att aaa gat | | | 1008 |
| Ile Ala Leu Leu Cys Thr Gln Ala Val Gly Thr Ser Thr Ile Lys Asp | | | |
| | 325 | 330 | 335 |
| gcc gag gaa tta aaa gta aaa gaa aca aat aga att gat aca acg gct | | | 1056 |
| Ala Glu Glu Leu Lys Val Lys Glu Thr Asn Arg Ile Asp Thr Thr Ala | | | |
| | 340 | 345 | 350 |

gat atg tta aac ttg tta ggg ttt gaa tta caa cca act aat gat gga 1104
 Asp Met Leu Asn Leu Leu Gly Phe Glu Leu Gln Pro Thr Asn Asp Gly
 355 360 365

ttg att att cat ccg tca gaa ttt aaa aca aat gca aca gat att tta 1152
 Leu Ile Ile His Pro Ser Glu Phe Lys Thr Asn Ala Thr Asp Ile Leu
 370 375 380

act gat cat cga ata gga atg atg ctt gca gtt gct tgt gta ctt tca 1200
 Thr Asp His Arg Ile Gly Met Met Leu Ala Val Ala Cys Val Leu Ser
 385 390 395 400

agc gag cct gtc aaa atc aaa caa ttt gat gct gta aat gta tca ttt 1248
 Ser Glu Pro Val Lys Ile Lys Gln Phe Asp Ala Val Asn Val Ser Phe
 405 410 415

cca gga ttt tta cca aaa cta aag ctt tta caa aat gag gga taa 1293
 Pro Gly Phe Leu Pro Lys Leu Lys Leu Leu Gln Asn Glu Gly
 420 425 430

<210> 44
 <211> 430
 <212> PRT
 <213> Staphylococcus aureus

<400> 44

Met Val Asn Glu Gln Ile Ile Asp Ile Ser Gly Pro Leu Lys Gly Glu
 1 5 10 15

Ile Glu Val Pro Gly Asp Lys Ser Met Thr His Arg Ala Ile Met Leu
 20 25 30

Ala Ser Leu Ala Glu Gly Val Ser Thr Ile Tyr Lys Pro Leu Leu Gly
 35 40 45

Glu Asp Cys Arg Arg Thr Met Asp Ile Phe Arg His Leu Gly Val Glu
 50 55 60

Ile Lys Glu Asp Asp Glu Lys Leu Val Val Thr Ser Pro Gly Tyr Gln
 65 70 75 80

Val Asn Thr Pro His Gln Val Leu Tyr Thr Gly Asn Ser Gly Thr Thr
 85 90 95

Thr Arg Leu Leu Ala Gly Leu Leu Ser Gly Leu Gly Asn Glu Ser Val
 100 105 110

144

7

Leu Ser Gly Asp Val Ser Ile Gly Lys Arg Pro Met Asp Arg Val Leu
115 120 125

Arg Pro Leu Lys Leu Met Asp Ala Asn Ile Glu Gly Ile Glu Asp Asn
130 135 140

Tyr Thr Pro Leu Ile Ile Lys Pro Ser Val Ile Lys Gly Ile Asn Tyr
145 150 155 160

Gln Met Glu Val Ala Ser Ala Gln Val Lys Ser Ala Ile Leu Phe Ala
165 170 175

Ser Leu Phe Ser Lys Glu Pro Thr Ile Ile Lys Glu Leu Asp Val Ser
180 185 190

Arg Asn His Thr Glu Thr Met Phe Lys His Phe Asn Ile Pro Ile Glu
195 200 205

Ala Glu Gly Leu Ser Ile Asn Thr Thr Pro Glu Ala Ile Arg Tyr Ile
210 215 220

Lys Pro Ala Asp Phe His Val Pro Gly Asp Ile Ser Ser Ala Ala Phe
225 230 235 240

Phe Ile Val Ala Ala Leu Ile Thr Pro Gly Ser Asp Val Thr Ile His
245 250 255

Asn Val Gly Ile Asn Gln Thr Arg Ser Gly Ile Ile Asp Ile Val Glu
260 265 270

Lys Met Gly Gly Asn Ile Gln Leu Phe Asn Gln Thr Thr Gly Ala Glu
275 280 285

Pro Thr Ala Ser Ile Arg Ile Gln Tyr Thr Pro Met Leu Gln Pro Ile
290 295 300

Thr Ile Glu Gly Glu Leu Val Pro Lys Ala Ile Asp Glu Leu Pro Val
305 310 315 320

Ile Ala Leu Leu Cys Thr Gln Ala Val Gly Thr Ser Thr Ile Lys Asp
325 330 335

Ala Glu Glu Leu Lys Val Lys Glu Thr Asn Arg Ile Asp Thr Thr Ala
340 345 350

Asp Met Leu Asn Leu Leu Gly Phe Glu Leu Gln Pro Thr Asn Asp Gly
355 360 365

Leu Ile Ile His Pro Ser Glu Phe Lys Thr Asn Ala Thr Asp Ile Leu
370 375 380

Thr Asp His Arg Ile Gly Met Met Leu Ala Val Ala Cys Val Leu Ser
385 390 395 400

Ser Glu Pro Val Lys Ile Lys Gln Phe Asp Ala Val Asn Val Ser Phe
405 410 415

Pro Gly Phe Leu Pro Lys Leu Lys Leu Leu Gln Asn Glu Gly
420 425 430

<210> 45
<211> 28
<212> DNA
<213> Artificial sequence

<220>
<223> Oligonucleotide

<400> 45
ggaacatatg aaacgagata aggtgcag

28

<210> 46
<211> 35
<212> DNA
<213> Artificial sequence

<220>
<223> Oligonucleotide

<400> 46
ggaattcaaa cttcaggatc ttgagataga aaatg

35

<210> 47
<211> 28

1410

7

<212> DNA
<213> Artificial sequence

<220>
<223> Oligonucleotide

<400> 47
ggggccatgg taaatgaaca aatcattg

28

<210> 48
<211> 33
<212> DNA
<213> Artificial sequence

<220>
<223> Oligonucleotide

<400> 48
gggggagctc attatccctc attttgtaaa agc

33

<210> 49
<211> 480
<212> PRT
<213> Saccharomyces cerevisiae

<400> 49

Leu Thr Asp Glu Thr Leu Val Tyr Pro Phe Lys Asp Ile Pro Ala Asp
1 5 10 15

Gln Gln Lys Val Val Ile Pro Pro Gly Ser Lys Ser Ile Ser Asn Arg
20 25 30

Ala Leu Ile Leu Ala Ala Leu Gly Glu Gly Gln Cys Lys Ile Lys Asn
35 40 45

Leu Leu His Ser Asp Asp Thr Lys His Met Leu Thr Ala Val His Glu
50 55 60

Leu Lys Gly Ala Thr Ile Ser Trp Glu Asp Asn Gly Glu Thr Val Val
65 70 75 80

Val Glu Gly His Gly Gly Ser Thr Leu Ser Ala Cys Ala Asp Pro Leu
85 90 95

Tyr Leu Gly Asn Ala Gly Thr Ala Ser Arg Phe Leu Thr Ser Leu Ala
100 105 110

Ala Leu Val Asn Ser Thr Ser Ser Gln Lys Tyr Ile Val Leu Thr Gly
115 120 125

Asn Ala Arg Met Gln Gln Arg Pro Ile Ala Pro Leu Val Asp Ser Leu

147

7

| | | | | |
|---|-----|-----|-----|---------|
| 130 | | 135 | | 140 |
| Arg Ala Asn Gly Thr Lys Ile Glu Tyr Leu Asn Asn Glu Gly Ser Leu | | | | |
| 145 | | 150 | | 155 160 |
| Pro Ile Lys Val Tyr Thr Asp Ser Val Phe Lys Gly Gly Arg Ile Glu | | | | |
| | 165 | | 170 | 175 |
| Leu Ala Ala Thr Val Ser Ser Gln Tyr Val Ser Ser Ile Leu Met Cys | | | | |
| | 180 | | 185 | 190 |
| Ala Pro Tyr Ala Glu Glu Pro Val Thr Leu Ala Leu Val Gly Gly Lys | | | | |
| | 195 | | 200 | 205 |
| Pro Ile Ser Lys Leu Tyr Val Asp Met Thr Ile Lys Met Met Glu Lys | | | | |
| | 210 | | 215 | 220 |
| Phe Gly Ile Asn Val Glu Thr Ser Thr Thr Glu Pro Tyr Thr Tyr Tyr | | | | |
| 225 | | 230 | | 235 240 |
| Ile Pro Lys Gly His Tyr Ile Asn Pro Ser Glu Tyr Val Ile Glu Ser | | | | |
| | 245 | | 250 | 255 |
| Asp Ala Ser Ser Ala Thr Tyr Pro Leu Ala Phe Ala Ala Met Thr Gly | | | | |
| | 260 | | 265 | 270 |
| Thr Thr Val Thr Val Pro Asn Ile Gly Phe Glu Ser Leu Gln Gly Asp | | | | |
| | 275 | | 280 | 285 |
| Ala Arg Phe Ala Arg Asp Val Leu Lys Pro Met Gly Cys Lys Ile Thr | | | | |
| 290 | | 295 | | 300 |
| Gln Thr Ala Thr Ser Thr Thr Val Ser Gly Pro Pro Val Gly Thr Leu | | | | |
| 305 | | 310 | | 315 320 |
| Lys Pro Leu Lys His Val Asp Met Glu Pro Met Thr Asp Ala Phe Leu | | | | |
| | 325 | | 330 | 335 |
| Thr Ala Cys Val Val Ala Ala Ile Ser His Asp Ser Asp Pro Asn Ser | | | | |
| | 340 | | 345 | 350 |
| Ala Asn Thr Thr Thr Ile Glu Gly Ile Ala Asn Gln Arg Val Lys Glu | | | | |
| | 355 | | 360 | 365 |
| Cys Asn Arg Ile Leu Ala Met Ala Thr Glu Leu Ala Lys Phe Gly Val | | | | |
| 370 | | 375 | | 380 |
| Lys Thr Thr Glu Leu Pro Asp Gly Ile Gln Val His Gly Leu Asn Ser | | | | |
| 385 | | 390 | | 395 400 |
| Ile Lys Asp Leu Lys Val Pro Ser Asp Ser Ser Gly Pro Val Gly Val | | | | |
| | 405 | | 410 | 415 |
| Cys Thr Tyr Asp Asp His Arg Val Ala Met Ser Phe Ser Leu Leu Ala | | | | |

148

F

420

425

430

Gly Met Val Asn Ser Gln Asn Glu Arg Asp Glu Val Ala Asn Pro Val
 435 440 445

Arg Ile Leu Glu Arg His Cys Thr Gly Lys Thr Trp Pro Gly Trp Trp
 450 455 460

Asp Val Leu His Ser Glu Leu Gly Ala Lys Leu Asp Gly Ala Glu Pro
 465 470 475 480

<210> 50

<211> 460

<212> PRT

<213> Aspergillus nidulans

<400> 50

Leu Ala Pro Ser Ile Glu Val His Pro Gly Val Ala His Ser Ser Asn
 1 5 10 15

Val Ile Cys Ala Pro Pro Gly Ser Lys Ser Ile Ser Asn Arg Ala Leu
 20 25 30

Val Leu Ala Ala Leu Gly Ser Gly Thr Cys Arg Ile Lys Asn Leu Leu
 35 40 45

His Ser Asp Asp Thr Glu Val Met Leu Asn Ala Leu Glu Arg Leu Gly
 50 55 60

Ala Ala Thr Phe Ser Trp Glu Glu Glu Gly Glu Val Leu Val Val Asn
 65 70 75 80

Gly Lys Gly Gly Asn Leu Gln Ala Ser Ser Ser Pro Leu Tyr Leu Gly
 85 90 95

Asn Ala Gly Thr Ala Ser Arg Phe Leu Thr Thr Val Ala Thr Leu Ala
 100 105 110

Asn Ser Ser Thr Val Asp Ser Ser Val Leu Thr Gly Asn Asn Arg Met
 115 120 125

Lys Gln Arg Pro Ile Gly Asp Leu Val Asp Ala Leu Thr Ala Asn Val
 130 135 140

Leu Pro Leu Asn Thr Ser Lys Gly Arg Ala Ser Leu Pro Leu Lys Ile
 145 150 155 160

Ala Ala Ser Gly Gly Phe Ala Gly Gly Asn Ile Asn Leu Ala Ala Lys
 165 170 175

Val Ser Ser Gln Tyr Val Ser Ser Leu Leu Met Cys Ala Pro Tyr Ala
 180 185 190

Lys Glu Pro Val Thr Leu Arg Leu Val Gly Gly Lys Pro Ile Ser Gln
 195 200 205
 Pro Tyr Ile Asp Met Thr Thr Ala Met Met Arg Ser Phe Gly Ile Asp
 210 215 220
 Val Gln Lys Ser Thr Thr Glu Glu His Thr Tyr His Ile Pro Gln Gly
 225 230 235 240
 Arg Tyr Val Asn Pro Ala Glu Tyr Val Ile Glu Ser Asp Ala Ser Cys
 245 250 255
 Ala Thr Tyr Pro Leu Ala Val Ala Ala Val Thr Gly Thr Thr Cys Thr
 260 265 270
 Val Pro Asn Ile Gly Ser Ala Ser Leu Gln Gly Asp Ala Arg Phe Ala
 275 280 285
 Val Glu Val Leu Arg Pro Met Gly Cys Thr Val Glu Gln Thr Glu Thr
 290 295 300
 Ser Thr Thr Val Thr Gly Pro Ser Asp Gly Ile Leu Arg Ala Thr Ser
 305 310 315 320
 Lys Arg Gly Tyr Gly Thr Asn Asp Arg Cys Val Pro Arg Cys Phe Arg
 325 330 335
 Thr Gly Ser His Arg Pro Met Glu Lys Ser Gln Thr Thr Pro Pro Val
 340 345 350
 Ser Ser Gly Ile Ala Asn Gln Arg Val Lys Glu Cys Asn Arg Ile Lys
 355 360 365
 Ala Met Lys Asp Glu Leu Ala Lys Phe Gly Val Ile Cys Arg Glu His
 370 375 380
 Asp Asp Gly Leu Glu Ile Asp Gly Ile Asp Arg Ser Asn Leu Arg Gln
 385 390 395 400
 Pro Val Gly Gly Val Phe Cys Tyr Asp Asp His Arg Val Ala Phe Ser
 405 410 415
 Phe Ser Val Leu Ser Leu Val Thr Pro Gln Pro Thr Leu Ile Leu Glu
 420 425 430
 Lys Glu Cys Val Gly Lys Thr Trp Pro Gly Trp Trp Asp Thr Leu Arg
 435 440 445
 Gln Leu Phe Lys Val Lys Leu Glu Gly Lys Glu Leu
 450 455 460

<210> 51
 <211> 444
 <212> PRT

150

7

<213> Brassica napus

<400> 51

Lys Ala Ser Glu Ile Val Leu Gln Pro Ile Arg Glu Ile Ser Gly Leu
1 5 10 15
Ile Lys Leu Pro Gly Ser Lys Ser Leu Ser Asn Arg Ile Leu Leu Leu
20 25 30
Ala Ala Leu Ser Glu Gly Thr Thr Val Val Asp Asn Leu Leu Asn Ser
35 40 45
Asp Asp Ile Asn Tyr Met Leu Asp Ala Leu Lys Lys Leu Gly Leu Asn
50 55 60
Val Glu Arg Asp Ser Val Asn Asn Arg Ala Val Val Glu Gly Cys Gly
65 70 75 80
Gly Ile Phe Pro Ala Ser Leu Asp Ser Lys Ser Asp Ile Glu Leu Tyr
85 90 95
Leu Gly Asn Ala Gly Thr Ala Met Arg Pro Leu Thr Ala Ala Val Thr
100 105 110
Ala Ala Gly Gly Asn Ala Ser Tyr Val Leu Asp Gly Val Pro Arg Met
115 120 125
Arg Glu Arg Pro Ile Gly Asp Leu Val Val Gly Leu Lys Gln Leu Gly
130 135 140
Ala Asp Val Glu Cys Thr Leu Gly Thr Asn Cys Pro Pro Val Arg Val
145 150 155 160
Asn Ala Asn Gly Gly Leu Pro Gly Gly Lys Val Lys Leu Ser Gly Ser
165 170 175
Ile Ser Ser Gln Tyr Leu Thr Ala Leu Leu Met Ala Ala Pro Leu Ala
180 185 190
Leu Gly Asp Val Glu Ile Glu Ile Ile Asp Lys Leu Ile Ser Val Pro
195 200 205
Tyr Val Glu Met Thr Leu Lys Leu Met Glu Arg Phe Gly Val Ser Ala
210 215 220
Glu His Ser Asp Ser Trp Asp Arg Phe Phe Val Lys Gly Gly Gln Lys
225 230 235 240
Tyr Lys Ser Pro Gly Asn Ala Tyr Val Glu Gly Asp Ala Ser Ser Ala
245 250 255
Ser Tyr Phe Leu Ala Gly Ala Ala Ile Thr Gly Glu Thr Val Thr Val
260 265 270

Glu Gly Cys Gly Thr Thr Ser Leu Gln Gly Asp Val Lys Phe Ala Glu
275 280 285

Val Leu Glu Lys Met Gly Cys Lys Val Ser Trp Thr Glu Asn Ser Val
290 295 300

Thr Val Thr Gly Pro Ser Arg Asp Ala Phe Gly Met Arg His Leu Arg
305 310 315 320

Ala Val Asp Val Asn Met Asn Lys Met Pro Asp Val Ala Met Thr Leu
325 330 335

Ala Val Val Ala Leu Phe Ala Asp Gly Pro Thr Thr Ile Arg Asp Val
340 345 350

Ala Ser Trp Arg Val Lys Glu Thr Glu Arg Met Ile Ala Ile Cys Thr
355 360 365

Glu Leu Arg Lys Leu Gly Ala Thr Val Glu Glu Gly Ser Asp Tyr Cys
370 375 380

Val Ile Thr Pro Pro Ala Lys Val Lys Pro Ala Glu Ile Asp Thr Tyr
385 390 395 400

Asp Asp His Arg Met Ala Met Ala Phe Ser Leu Ala Ala Cys Ala Asp
405 410 415

Val Pro Val Thr Ile Lys Asp Pro Gly Cys Thr Arg Lys Thr Phe Pro
420 425 430

Asp Tyr Phe Gln Val Leu Glu Ser Ile Thr Lys His
435 440

<210> 52

<211> 444

<212> PRT

<213> Arabidopsis thaliana

<400> 52

Lys Ala Ser Glu Ile Val Leu Gln Pro Ile Arg Glu Ile Ser Gly Leu
1 5 10 15

Ile Lys Leu Pro Gly Ser Lys Ser Leu Ser Asn Arg Ile Leu Leu Leu
20 25 30

Ala Ala Leu Ser Glu Gly Thr Thr Val Val Asp Asn Leu Leu Asn Ser
35 40 45

Asp Asp Ile Asn Tyr Met Leu Asp Ala Leu Lys Arg Leu Gly Leu Asn
50 55 60

Val Glu Thr Asp Ser Glu Asn Asn Arg Ala Val Val Glu Gly Cys Gly

152

F

| | | | | | | |
|---|-----|----|--|-----|--|-----|
| 65 | | 70 | | 75 | | 80 |
| Gly Ile Phe Pro Ala Ser Ile Asp Ser Lys Ser Asp Ile Glu Leu Tyr | | | | | | |
| | 85 | | | 90 | | 95 |
| Leu Gly Asn Ala Gly Thr Ala Met Arg Pro Leu Thr Ala Ala Val Thr | | | | | | |
| | 100 | | | 105 | | 110 |
| Ala Ala Gly Gly Asn Ala Ser Tyr Val Leu Asp Gly Val Pro Arg Met | | | | | | |
| | 115 | | | 120 | | 125 |
| Arg Glu Arg Pro Ile Gly Asp Leu Val Val Gly Leu Lys Gln Leu Gly | | | | | | |
| | 130 | | | 135 | | 140 |
| Ala Asp Val Glu Cys Thr Leu Gly Thr Asn Cys Pro Pro Val Arg Val | | | | | | |
| | 145 | | | 150 | | 155 |
| Asn Ala Asn Gly Gly Leu Pro Gly Gly Lys Val Lys Leu Ser Gly Ser | | | | | | |
| | | | | 165 | | 170 |
| | | | | | | 175 |
| Ile Ser Ser Gln Tyr Leu Thr Ala Leu Leu Met Ser Ala Pro Leu Ala | | | | | | |
| | 180 | | | 185 | | 190 |
| Leu Gly Asp Val Glu Ile Glu Ile Val Asp Lys Leu Ile Ser Val Pro | | | | | | |
| | 195 | | | 200 | | 205 |
| Tyr Val Glu Met Thr Leu Lys Leu Met Glu Arg Phe Gly Val Ser Val | | | | | | |
| | 210 | | | 215 | | 220 |
| Glu His Ser Asp Ser Trp Asp Arg Phe Phe Val Lys Gly Gly Gln Lys | | | | | | |
| | 225 | | | 230 | | 235 |
| | | | | | | 240 |
| Tyr Lys Ser Pro Gly Asn Ala Tyr Val Glu Gly Asp Ala Ser Ser Ala | | | | | | |
| | | | | 245 | | 250 |
| | | | | | | 255 |
| Cys Tyr Phe Leu Ala Gly Ala Ala Ile Thr Gly Glu Thr Val Thr Val | | | | | | |
| | 260 | | | 265 | | 270 |
| Glu Gly Cys Gly Thr Thr Ser Leu Gln Gly Asp Val Lys Phe Ala Glu | | | | | | |
| | 275 | | | 280 | | 285 |
| Val Leu Glu Lys Met Gly Cys Lys Val Ser Trp Thr Glu Asn Ser Val | | | | | | |
| | 290 | | | 295 | | 300 |
| Thr Val Thr Gly Pro Pro Arg Asp Ala Phe Gly Met Arg His Leu Arg | | | | | | |
| | 305 | | | 310 | | 315 |
| | | | | | | 320 |
| Ala Ile Asp Val Asn Met Asn Lys Met Pro Asp Val Ala Met Thr Leu | | | | | | |
| | | | | 325 | | 330 |
| | | | | | | 335 |
| Ala Val Val Ala Leu Phe Ala Asp Gly Pro Thr Thr Ile Arg Asp Val | | | | | | |
| | 340 | | | 345 | | 350 |
| Ala Ser Trp Arg Val Lys Glu Thr Glu Arg Met Ile Ala Ile Cys Thr | | | | | | |

153

F

355

360

365

Glu Leu Arg Lys Leu Gly Ala Thr Val Glu Glu Gly Ser Asp Tyr Cys
 370 375 380

Val Ile Thr Pro Pro Lys Lys Val Lys Thr Ala Glu Ile Asp Thr Tyr
 385 390 395 400

Asp Asp His Arg Met Ala Met Ala Phe Ser Leu Ala Ala Cys Ala Asp
 405 410 415

Val Pro Ile Thr Ile Asn Asp Ser Gly Cys Thr Arg Lys Thr Phe Pro
 420 425 430

Asp Tyr Phe Gln Val Leu Glu Arg Ile Thr Lys His
 435 440

<210> 53
 <211> 444
 <212> PRT
 <213> Nicotiana tabacum

<400> 53

Lys Pro Asn Glu Ile Val Leu Gln Pro Ile Lys Asp Ile Ser Gly Thr
 1 5 10 15

Val Lys Leu Pro Gly Ser Lys Ser Leu Ser Asn Arg Ile Leu Leu Leu
 20 25 30

Ala Ala Leu Ser Lys Gly Arg Thr Val Val Asp Asn Leu Leu Ser Ser
 35 40 45

Asp Asp Ile His Tyr Met Leu Gly Ala Leu Lys Thr Leu Gly Leu His
 50 55 60

Val Glu Asp Asp Asn Glu Asn Gln Arg Ala Ile Val Glu Gly Cys Gly
 65 70 75 80

Gly Gln Phe Pro Val Gly Lys Lys Ser Glu Glu Glu Ile Gln Leu Phe
 85 90 95

Leu Gly Asn Ala Gly Thr Ala Met Arg Pro Leu Thr Ala Ala Val Thr
 100 105 110

Val Ala Gly Gly His Ser Arg Tyr Val Leu Asp Gly Val Pro Arg Met
 115 120 125

Arg Glu Arg Pro Ile Gly Asp Leu Val Asp Gly Leu Lys Gln Leu Gly
 130 135 140

Ala Glu Val Asp Cys Phe Leu Gly Thr Asn Cys Pro Pro Val Arg Ile
 145 150 155 160

| | | | | | | | | | | | | | | | | | | | |
|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|
| Val | Ser | Lys | Gly | Gly | Leu | Pro | Gly | Gly | Lys | Val | Lys | Leu | Ser | Gly | Ser | 165 | 170 | 175 | |
| Ile | Ser | Ser | Gln | Tyr | Leu | Thr | Ala | Leu | Leu | Met | Ala | Ala | Pro | Leu | Ala | 180 | 185 | 190 | |
| Leu | Gly | Asp | Val | Glu | Ile | Glu | Ile | Ile | Asp | Lys | Leu | Ile | Ser | Val | Pro | 195 | 200 | 205 | |
| Tyr | Val | Glu | Met | Thr | Leu | Lys | Leu | Met | Glu | Arg | Phe | Gly | Val | Ser | Val | 210 | 215 | 220 | |
| Glu | His | Thr | Ser | Ser | Trp | Asp | Lys | Phe | Leu | Val | Arg | Gly | Gly | Gln | Lys | 225 | 230 | 235 | 240 |
| Tyr | Lys | Ser | Pro | Gly | Lys | Ala | Tyr | Val | Glu | Gly | Asp | Ala | Ser | Ser | Ala | 245 | 250 | 255 | |
| Ser | Tyr | Phe | Leu | Ala | Gly | Ala | Ala | Val | Thr | Gly | Gly | Thr | Val | Thr | Val | 260 | 265 | 270 | |
| Glu | Gly | Cys | Gly | Thr | Ser | Ser | Leu | Gln | Gly | Asp | Val | Lys | Phe | Ala | Glu | 275 | 280 | 285 | |
| Val | Leu | Glu | Lys | Met | Gly | Ala | Glu | Val | Thr | Trp | Thr | Glu | Asn | Ser | Val | 290 | 295 | 300 | |
| Thr | Val | Lys | Gly | Pro | Pro | Arg | Asn | Ser | Ser | Gly | Met | Lys | His | Leu | Arg | 305 | 310 | 315 | 320 |
| Ala | Val | Asp | Val | Asn | Met | Asn | Lys | Met | Pro | Asp | Val | Ala | Met | Thr | Leu | 325 | 330 | 335 | |
| Ala | Val | Val | Ala | Leu | Phe | Ala | Asp | Gly | Pro | Thr | Ala | Ile | Arg | Asp | Val | 340 | 345 | 350 | |
| Ala | Ser | Trp | Arg | Val | Lys | Glu | Thr | Glu | Arg | Met | Ile | Ala | Ile | Cys | Thr | 355 | 360 | 365 | |
| Glu | Leu | Arg | Lys | Leu | Gly | Ala | Thr | Val | Val | Glu | Gly | Ser | Asp | Tyr | Cys | 370 | 375 | 380 | |
| Ile | Ile | Thr | Pro | Pro | Glu | Lys | Leu | Asn | Val | Thr | Glu | Ile | Asp | Thr | Tyr | 385 | 390 | 395 | 400 |
| Asp | Asp | His | Arg | Met | Ala | Met | Ala | Phe | Ser | Leu | Ala | Ala | Cys | Ala | Asp | 405 | 410 | 415 | |
| Val | Pro | Val | Thr | Ile | Lys | Asp | Pro | Gly | Cys | Thr | Arg | Lys | Thr | Phe | Pro | 420 | 425 | 430 | |
| Asn | Tyr | Phe | Asp | Val | Leu | Gln | Gln | Tyr | Ser | Lys | His | 435 | 440 | | | | | | |

155

7

<210> 54
 <211> 444
 <212> PRT
 <213> Lycopersicon esculentum

<220>
 <221> UNSURE
 <222> (1)..(444)
 <223> Xaa = any

<400> 54

| | | | | | | | | | | | | | | | |
|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|
| Lys | Pro | His | Glu | Ile | Val | Leu | Xaa | Pro | Ile | Lys | Asp | Ile | Ser | Gly | Thr |
| 1 | | | | 5 | | | | | 10 | | | | | 15 | |
| Val | Lys | Leu | Pro | Gly | Ser | Lys | Ser | Leu | Ser | Asn | Arg | Ile | Leu | Leu | Leu |
| | | | 20 | | | | | 25 | | | | | 30 | | |
| Ala | Ala | Leu | Ser | Glu | Gly | Arg | Thr | Val | Val | Asp | Asn | Leu | Leu | Ser | Ser |
| | | 35 | | | | | 40 | | | | | 45 | | | |
| Asp | Asp | Ile | His | Tyr | Met | Leu | Gly | Ala | Leu | Lys | Thr | Leu | Gly | Leu | His |
| | 50 | | | | | 55 | | | | | 60 | | | | |
| Val | Glu | Asp | Asp | Asn | Glu | Asn | Gln | Arg | Ala | Ile | Val | Glu | Gly | Cys | Gly |
| 65 | | | | | 70 | | | | | 75 | | | | 80 | |
| Gly | Gln | Phe | Pro | Val | Gly | Lys | Lys | Ser | Glu | Glu | Glu | Ile | Gln | Leu | Phe |
| | | | | 85 | | | | | 90 | | | | | 95 | |
| Leu | Gly | Asn | Ala | Gly | Thr | Ala | Met | Arg | Pro | Leu | Thr | Ala | Ala | Val | Thr |
| | | 100 | | | | | | 105 | | | | | | 110 | |
| Val | Ala | Gly | Gly | His | Ser | Arg | Tyr | Val | Leu | Asp | Gly | Val | Pro | Arg | Met |
| | | 115 | | | | | 120 | | | | | 125 | | | |
| Arg | Glu | Arg | Pro | Ile | Gly | Asp | Leu | Val | Asp | Gly | Leu | Lys | Gln | Leu | Gly |
| | 130 | | | | | 135 | | | | | 140 | | | | |
| Ala | Glu | Val | Asp | Cys | Ser | Leu | Gly | Thr | Asn | Cys | Pro | Pro | Val | Arg | Ile |
| 145 | | | | | 150 | | | | | 155 | | | | | 160 |
| Val | Ser | Lys | Gly | Gly | Leu | Pro | Gly | Gly | Lys | Val | Lys | Leu | Ser | Gly | Ser |
| | | | 165 | | | | | | 170 | | | | | 175 | |
| Ile | Ser | Ser | Gln | Tyr | Leu | Thr | Ala | Leu | Leu | Met | Ala | Ala | Pro | Leu | Ala |
| | | | 180 | | | | | 185 | | | | | 190 | | |
| Leu | Gly | Asp | Val | Glu | Ile | Glu | Ile | Ile | Asp | Lys | Leu | Ile | Ser | Val | Pro |
| | 195 | | | | | | 200 | | | | | 205 | | | |
| Tyr | Val | Glu | Met | Thr | Leu | Lys | Leu | Met | Glu | Arg | Phe | Gly | Val | Phe | Val |
| | 210 | | | | | 215 | | | | | 220 | | | | |

156

F

Glu His Ser Ser Gly Trp Asp Arg Phe Leu Val Lys Gly Gly Gln Lys
225 230 235 240

Tyr Lys Ser Pro Gly Lys Ala Phe Val Glu Gly Asp Ala Ser Ser Ala
245 250 255

Ser Tyr Phe Leu Ala Gly Ala Ala Val Thr Gly Gly Thr Val Thr Val
260 265 270

Glu Gly Cys Gly Thr Ser Ser Leu Gln Gly Asp Val Lys Phe Ala Glu
275 280 285

Val Leu Glu Lys Met Gly Ala Glu Val Thr Trp Thr Glu Asn Ser Val
290 295 300

Thr Val Lys Gly Pro Pro Arg Asn Ser Ser Gly Met Lys His Leu Arg
305 310 315 320

Ala Ile Asp Val Asn Met Asn Lys Met Pro Asp Val Ala Met Thr Leu
325 330 335

Ala Val Val Ala Leu Phe Ala Asp Gly Pro Thr Thr Ile Arg Asp Val
340 345 350

Ala Ser Trp Arg Val Lys Glu Thr Glu Arg Met Ile Ala Ile Cys Thr
355 360 365

Glu Leu Arg Lys Leu Gly Ala Thr Val Val Glu Gly Ser Asp Tyr Cys
370 375 380

Ile Ile Thr Pro Pro Glu Lys Leu Asn Val Thr Glu Ile Asp Thr Tyr
385 390 395 400

Asp Asp His Arg Met Ala Met Ala Phe Ser Leu Ala Ala Cys Ala Asp
405 410 415

Val Pro Val Thr Ile Lys Asn Pro Gly Cys Thr Arg Lys Thr Phe Pro
420 425 430

Asp Tyr Phe Glu Val Leu Gln Lys Tyr Ser Lys His
435 440

<210> 55
<211> 444
<212> PRT
<213> Petunia x hybrida

<400> 55

Lys Pro Ser Glu Ile Val Leu Gln Pro Ile Lys Glu Ile Ser Gly Thr
1 5 10 15

Val Lys Leu Pro Gly Ser Lys Ser Leu Ser Asn Arg Ile Leu Leu Leu

| 20 | | | | | 25 | | | | | 30 | | | | | | |
|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|--|
| Ala | Ala | Leu | Ser | Glu | Gly | Thr | Thr | Val | Val | Asp | Asn | Leu | Leu | Ser | Ser | |
| 35 | | | | | 40 | | | | | 45 | | | | | | |
| Asp | Asp | Ile | His | Tyr | Met | Leu | Gly | Ala | Leu | Lys | Thr | Leu | Gly | Leu | His | |
| 50 | | | | | 55 | | | | | 60 | | | | | | |
| Val | Glu | Glu | Asp | Ser | Ala | Asn | Gln | Arg | Ala | Val | Val | Glu | Gly | Cys | Gly | |
| 65 | | | | | 70 | | | | | 75 | | | | | 80 | |
| Gly | Leu | Phe | Pro | Val | Gly | Lys | Glu | Ser | Lys | Glu | Glu | Ile | Gln | Leu | Phe | |
| 85 | | | | | 90 | | | | | 95 | | | | | | |
| Leu | Gly | Asn | Ala | Gly | Thr | Ala | Met | Arg | Pro | Leu | Thr | Ala | Ala | Val | Thr | |
| 100 | | | | | 105 | | | | | 110 | | | | | | |
| Val | Ala | Gly | Gly | Asn | Ser | Arg | Tyr | Val | Leu | Asp | Gly | Val | Pro | Arg | Met | |
| 115 | | | | | 120 | | | | | 125 | | | | | | |
| Arg | Glu | Arg | Pro | Ile | Ser | Asp | Leu | Val | Asp | Gly | Leu | Lys | Gln | Leu | Gly | |
| 130 | | | | | 135 | | | | | 140 | | | | | | |
| Ala | Glu | Val | Asp | Cys | Phe | Leu | Gly | Thr | Lys | Cys | Pro | Pro | Val | Arg | Ile | |
| 145 | | | | | 150 | | | | | 155 | | | | | 160 | |
| Val | Ser | Lys | Gly | Gly | Leu | Pro | Gly | Gly | Lys | Val | Lys | Leu | Ser | Gly | Ser | |
| 165 | | | | | 170 | | | | | 175 | | | | | | |
| Ile | Ser | Ser | Gln | Tyr | Leu | Thr | Ala | Leu | Leu | Met | Ala | Ala | Pro | Leu | Ala | |
| 180 | | | | | 185 | | | | | 190 | | | | | | |
| Leu | Gly | Asp | Val | Glu | Ile | Glu | Ile | Ile | Asp | Lys | Leu | Ile | Ser | Val | Pro | |
| 195 | | | | | 200 | | | | | 205 | | | | | | |
| Tyr | Val | Glu | Met | Thr | Leu | Lys | Leu | Met | Glu | Arg | Phe | Gly | Ile | Ser | Val | |
| 210 | | | | | 215 | | | | | 220 | | | | | | |
| Glu | His | Ser | Ser | Ser | Trp | Asp | Arg | Phe | Phe | Val | Arg | Gly | Gly | Gln | Lys | |
| 225 | | | | | 230 | | | | | 235 | | | | | 240 | |
| Tyr | Lys | Ser | Pro | Gly | Lys | Ala | Phe | Val | Glu | Gly | Asp | Ala | Ser | Ser | Ala | |
| 245 | | | | | 250 | | | | | 255 | | | | | | |
| Ser | Tyr | Phe | Leu | Ala | Gly | Ala | Ala | Val | Thr | Gly | Gly | Thr | Ile | Thr | Val | |
| 260 | | | | | 265 | | | | | 270 | | | | | | |
| Glu | Gly | Cys | Gly | Thr | Asn | Ser | Leu | Gln | Gly | Asp | Val | Lys | Phe | Ala | Glu | |
| 275 | | | | | 280 | | | | | 285 | | | | | | |
| Val | Leu | Glu | Lys | Met | Gly | Ala | Glu | Val | Thr | Trp | Thr | Glu | Asn | Ser | Val | |
| 290 | | | | | 295 | | | | | 300 | | | | | | |
| Thr | Val | Lys | Gly | Pro | Pro | Arg | Ser | Ser | Ser | Gly | Arg | Lys | His | Leu | Arg | |

| | | | | | | |
|---|-----|-----|-----|-----|--|-----|
| 305 | | 310 | | 315 | | 320 |
| Ala Ile Asp Val Asn Met Asn Lys Met Pro Asp Val Ala Met Thr Leu | | | | | | |
| | 325 | | | 330 | | 335 |
| Ala Val Val Ala Leu Tyr Ala Asp Gly Pro Thr Ala Ile Arg Asp Val | | | | | | |
| | 340 | | 345 | | | 350 |
| Ala Ser Trp Arg Val Lys Glu Thr Glu Arg Met Ile Ala Ile Cys Thr | | | | | | |
| | 355 | | 360 | | | 365 |
| Glu Leu Arg Lys Leu Gly Ala Thr Val Glu Glu Gly Pro Asp Tyr Cys | | | | | | |
| | 370 | | 375 | | | 380 |
| Ile Ile Thr Pro Pro Glu Lys Leu Asn Val Thr Asp Ile Asp Thr Tyr | | | | | | |
| | 385 | | 390 | | | 395 |
| Asp Asp His Arg Met Ala Met Ala Phe Ser Leu Ala Ala Cys Ala Asp | | | | | | |
| | | 405 | | 410 | | 415 |
| Val Pro Val Thr Ile Asn Asp Pro Gly Cys Thr Arg Lys Thr Phe Pro | | | | | | |
| | 420 | | 425 | | | 430 |
| Asn Tyr Phe Asp Val Leu Gln Gln Tyr Ser Lys His | | | | | | |
| | 435 | | 440 | | | |

<210> 56
 <211> 444
 <212> PRT
 <213> Zea mays

 <400> 56

| | | | | | | |
|---|-----|----|-----|----|--|-----|
| Ala Gly Ala Glu Glu Ile Val Leu Gln Pro Ile Lys Glu Ile Ser Gly | | | | | | |
| 1 | | 5 | | 10 | | 15 |
| Thr Val Lys Leu Pro Gly Ser Lys Ser Leu Ser Asn Arg Ile Leu Leu | | | | | | |
| | 20 | | 25 | | | 30 |
| Leu Ala Ala Leu Ser Glu Gly Thr Thr Val Val Asp Asn Leu Leu Asn | | | | | | |
| | 35 | | 40 | | | 45 |
| Ser Glu Asp Val His Tyr Met Leu Gly Ala Leu Arg Thr Leu Gly Leu | | | | | | |
| | 50 | | 55 | | | 60 |
| Ser Val Glu Ala Asp Lys Ala Ala Lys Arg Ala Val Val Val Gly Cys | | | | | | |
| 65 | | 70 | | 75 | | 80 |
| Gly Gly Lys Phe Pro Val Glu Asp Ala Lys Glu Glu Val Gln Leu Phe | | | | | | |
| | 85 | | 90 | | | 95 |
| Leu Gly Asn Ala Gly Thr Ala Met Arg Pro Leu Thr Ala Ala Val Thr | | | | | | |
| | 100 | | 105 | | | 110 |

53

1600

F

Asp Asp His Arg Met Ala Met Ala Phe Ser Leu Ala Ala Cys Ala Glu
 405 410 415

Val Pro Val Thr Ile Arg Asp Pro Gly Cys Thr Arg Lys Thr Phe Pro
 420 425 430

Asp Tyr Phe Asp Val Leu Ser Thr Phe Val Lys Asn
 435 440

<210> 57
 <211> 427
 <212> PRT
 <213> Salmonella gallinarum

<400> 57

Met Glu Ser Leu Thr Leu Gln Pro Ile Ala Arg Val Asp Gly Ala Ile
 1 5 10 15

Asn Leu Pro Gly Ser Lys Ser Val Ser Asn Arg Ala Leu Leu Ala
 20 25 30

Ala Leu Ala Cys Gly Lys Thr Val Leu Thr Asn Leu Leu Asp Ser Asp
 35 40 45

Asp Val Arg His Met Leu Asn Ala Leu Ser Ala Leu Gly Ile Asn Tyr
 50 55 60

Thr Leu Ser Ala Asp Arg Thr Arg Cys Asp Ile Thr Gly Asn Gly Gly
 65 70 75 80

Pro Leu Arg Ala Pro Gly Ala Leu Glu Leu Phe Leu Gly Asn Ala Gly
 85 90 95

Thr Ala Met Arg Pro Leu Ala Ala Ala Leu Cys Leu Gly Gln Asn Glu
 100 105 110

Ile Val Leu Thr Gly Glu Pro Arg Met Lys Glu Arg Pro Ile Gly His
 115 120 125

Leu Val Asp Ser Leu Arg Gln Gly Gly Ala Asn Ile Asp Tyr Leu Glu
 130 135 140

Gln Glu Asn Tyr Pro Pro Leu Arg Leu Arg Gly Gly Phe Ile Gly Gly
 145 150 155 160

Asp Ile Glu Val Asp Gly Ser Val Ser Ser Gln Phe Leu Thr Ala Leu
 165 170 175

Leu Met Thr Ala Pro Leu Ala Pro Lys Asp Thr Ile Ile Arg Val Lys
 180 185 190

Gly Glu Leu Val Ser Lys Pro Tyr Ile Asp Ile Thr Leu Asn Leu Met
 195 200 205

1.61

A

Lys Thr Phe Gly Val Glu Ile Ala Asn His His Tyr Gln Gln Phe Val
 210 215 220
 Val Lys Gly Gly Gln Gln Tyr His Ser Pro Gly Arg Tyr Leu Val Glu
 225 230 235 240
 Gly Asp Ala Ser Ser Ala Ser Tyr Phe Leu Ala Ala Gly Ala Ile Lys
 245 250 255
 Gly Gly Thr Val Lys Val Thr Gly Ile Gly Arg Lys Ser Met Gln Gly
 260 265 270
 Asp Ile Arg Phe Ala Asp Val Leu Glu Lys Met Gly Ala Thr Ile Thr
 275 280 285
 Trp Gly Asp Asp Phe Ile Ala Cys Thr Arg Gly Glu Leu His Ala Ile
 290 295 300
 Asp Met Asp Met Asn His Ile Pro Asp Ala Ala Met Thr Ile Ala Thr
 305 310 315 320
 Thr Ala Leu Phe Ala Lys Gly Thr Thr Thr Leu Arg Asn Ile Tyr Asn
 325 330 335
 Trp Arg Val Lys Glu Thr Asp Arg Leu Phe Ala Met Ala Thr Glu Leu
 340 345 350
 Arg Lys Val Gly Ala Glu Val Glu Glu Gly His Asp Tyr Ile Arg Ile
 355 360 365
 Thr Pro Pro Ala Lys Leu Gln His Ala Asp Ile Gly Thr Tyr Asn Asp
 370 375 380
 His Arg Met Ala Met Cys Phe Ser Leu Val Ala Leu Ser Asp Thr Pro
 385 390 395 400
 Val Thr Ile Leu Asp Pro Lys Cys Thr Ala Lys Thr Phe Pro Asp Tyr
 405 410 415
 Phe Glu Gln Leu Ala Arg Met Ser Thr Pro Ala
 420 425

<210> 58
 <211> 427
 <212> PRT
 <213> Salmonella typhimurium

<400> 58

Met Glu Ser Leu Thr Leu Gln Pro Ile Ala Arg Val Asp Gly Ala Ile
 1 5 10 15

Asn Leu Pro Gly Ser Lys Ser Val Ser Asn Arg Ala Leu Leu Leu Ala

| 20 | | | | | 25 | | | | | 30 | | | | | |
|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|
| Ala | Leu | Ala | Cys | Gly | Lys | Thr | Val | Leu | Thr | Asn | Leu | Leu | Asp | Ser | Asp |
| | 35 | | | | | | 40 | | | | | 45 | | | |
| Asp | Val | Arg | His | Met | Leu | Asn | Ala | Leu | Ser | Ala | Leu | Gly | Ile | Asn | Tyr |
| | 50 | | | | | 55 | | | | | 60 | | | | |
| Thr | Leu | Ser | Ala | Asp | Arg | Thr | Arg | Cys | Asp | Ile | Thr | Gly | Asn | Gly | Gly |
| | 65 | | | | | 70 | | | | | 75 | | | | 80 |
| Pro | Leu | Arg | Ala | Ser | Gly | Thr | Leu | Glu | Leu | Phe | Leu | Gly | Asn | Ala | Gly |
| | | | | 85 | | | | | 90 | | | | | 95 | |
| Thr | Ala | Met | Arg | Pro | Leu | Ala | Ala | Ala | Leu | Cys | Leu | Gly | Gln | Asn | Glu |
| | | | 100 | | | | | 105 | | | | | 110 | | |
| Ile | Val | Leu | Thr | Gly | Glu | Pro | Arg | Met | Lys | Glu | Arg | Pro | Ile | Gly | His |
| | | 115 | | | | | 120 | | | | | 125 | | | |
| Leu | Val | Asp | Ser | Leu | Arg | Gln | Gly | Gly | Ala | Asn | Ile | Asp | Tyr | Leu | Glu |
| | 130 | | | | | 135 | | | | | 140 | | | | |
| Gln | Glu | Asn | Tyr | Pro | Pro | Leu | Arg | Leu | Arg | Gly | Gly | Phe | Ile | Gly | Gly |
| | 145 | | | | | 150 | | | | | 155 | | | | 160 |
| Asp | Ile | Glu | Val | Asp | Gly | Ser | Val | Ser | Ser | Gln | Phe | Leu | Thr | Ala | Leu |
| | | | | 165 | | | | | 170 | | | | | 175 | |
| Leu | Met | Thr | Ala | Pro | Leu | Ala | Pro | Glu | Asp | Thr | Ile | Ile | Arg | Val | Lys |
| | | | 180 | | | | | 185 | | | | | 190 | | |
| Gly | Glu | Leu | Val | Ser | Lys | Pro | Tyr | Ile | Asp | Ile | Thr | Leu | Asn | Leu | Met |
| | | 195 | | | | | 200 | | | | | 205 | | | |
| Lys | Thr | Phe | Gly | Val | Glu | Ile | Ala | Asn | His | His | Tyr | Gln | Gln | Phe | Val |
| | 210 | | | | | 215 | | | | | 220 | | | | |
| Val | Lys | Gly | Gly | Gln | Gln | Tyr | His | Ser | Pro | Gly | Arg | Tyr | Leu | Val | Glu |
| | 225 | | | | | 230 | | | | | 235 | | | | 240 |
| Gly | Asp | Ala | Ser | Ser | Ala | Ser | Tyr | Phe | Leu | Ala | Ala | Gly | Gly | Ile | Lys |
| | | | | 245 | | | | | 250 | | | | | 255 | |
| Gly | Gly | Thr | Val | Lys | Val | Thr | Gly | Ile | Gly | Gly | Lys | Ser | Met | Gln | Gly |
| | | | 260 | | | | | 265 | | | | | 270 | | |
| Asp | Ile | Arg | Phe | Ala | Asp | Val | Leu | His | Lys | Met | Gly | Ala | Thr | Ile | Thr |
| | | 275 | | | | | 280 | | | | | 285 | | | |
| Trp | Gly | Asp | Asp | Phe | Ile | Ala | Cys | Thr | Arg | Gly | Glu | Leu | His | Ala | Ile |
| | 290 | | | | | 295 | | | | | 300 | | | | |
| Asp | Met | Asp | Met | Asn | His | Ile | Pro | Asp | Ala | Ala | Met | Thr | Ile | Ala | Thr |

| | | | | | | | | | | | | | | | |
|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|
| 305 | | 310 | | 315 | | 320 | | | | | | | | | |
| Thr | Ala | Leu | Phe | Ala | Lys | Gly | Thr | Thr | Thr | Leu | Arg | Asn | Ile | Tyr | Asn |
| | | | | 325 | | | | | 330 | | | | | 335 | |
| Trp | Arg | Val | Lys | Glu | Thr | Asp | Arg | Leu | Phe | Ala | Met | Ala | Thr | Glu | Leu |
| | | | 340 | | | | | 345 | | | | | 350 | | |
| Arg | Lys | Val | Gly | Ala | Glu | Val | Glu | Glu | Gly | His | Asp | Tyr | Ile | Arg | Ile |
| | | 355 | | | | | 360 | | | | | 365 | | | |
| Thr | Pro | Pro | Ala | Lys | Leu | Gln | His | Ala | Asp | Ile | Gly | Thr | Tyr | Asn | Asp |
| | 370 | | | | | 375 | | | | | 380 | | | | |
| His | Arg | Met | Ala | Met | Cys | Phe | Ser | Leu | Val | Ala | Leu | Ser | Asp | Thr | Pro |
| 385 | | | | | 390 | | | | | 395 | | | | | 400 |
| Val | Thr | Ile | Leu | Asp | Pro | Lys | Cys | Thr | Ala | Lys | Thr | Phe | Pro | Asp | Tyr |
| | | | 405 | | | | | | 410 | | | | | 415 | |
| Phe | Glu | Gln | Leu | Ala | Arg | Met | Ser | Thr | Pro | Ala | | | | | |
| | | 420 | | | | | | 425 | | | | | | | |

<210> 59
 <211> 427
 <212> PRT
 <213> Klebsiella pneumoniae

 <400> 59

| | | | | | | | | | | | | | | | |
|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|
| Met | Glu | Ser | Leu | Thr | Leu | Gln | Pro | Ile | Ala | Arg | Val | Asp | Gly | Thr | Val |
| 1 | | | | 5 | | | | | 10 | | | | | 15 | |
| Asn | Leu | Pro | Gly | Ser | Lys | Ser | Val | Ser | Asn | Arg | Ala | Leu | Leu | Leu | Ala |
| | | 20 | | | | | | 25 | | | | | 30 | | |
| Ala | Leu | Ala | Arg | Gly | Thr | Thr | Val | Leu | Thr | Asn | Leu | Leu | Asp | Ser | Asp |
| | | 35 | | | | | 40 | | | | | 45 | | | |
| Asp | Val | Arg | His | Met | Leu | Asn | Ala | Leu | Ser | Ala | Leu | Gly | Val | His | Tyr |
| | 50 | | | | | 55 | | | | | 60 | | | | |
| Val | Leu | Ser | Ser | Asp | Arg | Thr | Arg | Cys | Glu | Val | Thr | Gly | Thr | Gly | Gly |
| 65 | | | | | 70 | | | | | 75 | | | | 80 | |
| Pro | Leu | Gln | Ala | Gly | Ser | Ala | Leu | Glu | Leu | Phe | Leu | Gly | Asn | Ala | Gly |
| | | | 85 | | | | | 90 | | | | | 95 | | |
| Thr | Ala | Met | Arg | Pro | Leu | Ala | Ala | Ala | Leu | Cys | Leu | Gly | Ser | Asn | Asp |
| | | 100 | | | | | | 105 | | | | | 110 | | |
| Ile | Val | Leu | Thr | Gly | Glu | Pro | Arg | Met | Lys | Glu | Arg | Pro | Ile | Gly | His |
| | | 115 | | | | | 120 | | | | | 125 | | | |

164

F

| | | | |
|---|-----|-----|-----|
| Leu Val Asp Ala Leu Arg Gln Gly Gly Ala Gln Ile Asp Tyr Leu Glu | | | |
| 130 | 135 | 140 | |
| Gln Glu Asn Tyr Pro Pro Leu Arg Leu Arg Gly Gly Phe Thr Gly Gly | | | |
| 145 | 150 | 155 | 160 |
| Asp Val Glu Val Asp Gly Ser Val Ser Ser Gln Phe Leu Thr Ala Leu | | | |
| 165 | 170 | 175 | |
| Leu Met Ala Ser Pro Leu Ala Pro Gln Asp Thr Val Ile Ala Ile Lys | | | |
| 180 | 185 | 190 | |
| Gly Glu Leu Val Ser Arg Pro Tyr Ile Asp Ile Thr Leu His Leu Met | | | |
| 195 | 200 | 205 | |
| Lys Thr Phe Gly Val Glu Val Glu Asn Gln Ala Tyr Gln Arg Phe Ile | | | |
| 210 | 215 | 220 | |
| Val Arg Gly Asn Gln Gln Tyr Gln Ser Pro Gly Asp Tyr Leu Val Glu | | | |
| 225 | 230 | 235 | 240 |
| Gly Asp Ala Ser Ser Ala Ser Tyr Phe Leu Ala Ala Gly Ala Ile Lys | | | |
| 245 | 250 | 255 | |
| Gly Gly Thr Val Lys Val Thr Gly Ile Gly Arg Asn Ser Val Gln Gly | | | |
| 260 | 265 | 270 | |
| Asp Ile Arg Phe Ala Asp Val Leu Glu Lys Met Gly Ala Thr Val Thr | | | |
| 275 | 280 | 285 | |
| Trp Gly Glu Asp Tyr Ile Ala Cys Thr Arg Gly Glu Leu Asn Ala Ile | | | |
| 290 | 295 | 300 | |
| Asp Met Asp Met Asn His Ile Pro Asp Ala Ala Met Thr Ile Ala Thr | | | |
| 305 | 310 | 315 | 320 |
| Ala Ala Leu Phe Ala Arg Gly Thr Thr Thr Leu Arg Asn Ile Tyr Asn | | | |
| 325 | 330 | 335 | |
| Trp Arg Val Lys Glu Thr Asp Arg Leu Phe Ala Met Ala Thr Glu Leu | | | |
| 340 | 345 | 350 | |
| Arg Lys Val Gly Ala Glu Val Glu Glu Gly Glu Asp Tyr Ile Arg Ile | | | |
| 355 | 360 | 365 | |
| Thr Pro Pro Leu Thr Leu Gln Phe Ala Glu Ile Gly Thr Tyr Asn Asp | | | |
| 370 | 375 | 380 | |
| His Arg Met Ala Met Cys Phe Ser Leu Val Ala Leu Ser Asp Thr Pro | | | |
| 385 | 390 | 395 | 400 |
| Val Thr Ile Leu Asp Pro Lys Cys Thr Ala Lys Thr Phe Pro Asp Tyr | | | |
| 405 | 410 | 415 | |

Phe Gly Gln Leu Ala Arg Ile Ser Thr Leu Ala
 420 425

<210> 60
 <211> 427
 <212> PRT
 <213> Yersinia enterocolitica

<400> 60

Met Leu Glu Ser Leu Thr Leu His Pro Ile Ala Leu Ile Asn Gly Thr
 1 5 10 15

Val Asn Leu Pro Gly Ser Lys Ser Val Ser Asn Arg Ala Leu Leu Leu
 20 25 30

Ala Ala Leu Ala Glu Gly Thr Thr Gln Leu Asn Asn Leu Leu Asp Ser
 35 40 45

Asp Asp Ile Arg His Met Leu Asn Ala Leu Gln Ala Leu Gly Val Lys
 50 55 60

Tyr Arg Leu Ser Ala Asp Arg Thr Arg Cys Glu Val Asp Gly Leu Gly
 65 70 75 80

Gly Lys Leu Val Ala Glu Gln Pro Leu Glu Leu Phe Leu Gly Asn Ala
 85 90 95

Gly Thr Ala Met Arg Pro Leu Ala Ala Ala Leu Cys Leu Gly Lys Asn
 100 105 110

Asp Ile Val Leu Thr Gly Glu Pro Arg Met Lys Glu Arg Pro Ile Gly
 115 120 125

His Leu Val Asp Ala Leu Arg Gln Gly Gly Ala Gln Ile Asp Tyr Leu
 130 135 140

Glu Gln Glu Asn Tyr Arg Arg Cys Ile Ala Gly Gly Phe Arg Gly Gly
 145 150 155 160

Lys Leu Thr Val Asp Gly Ser Val Ser Ser Gln Phe Leu Thr Ala Leu
 165 170 175

Leu Met Thr Ala Pro Leu Ala Glu Gln Asp Thr Glu Ile Gln Ile Gln
 180 185 190

Gly Glu Leu Val Ser Lys Pro Tyr Ile Asp Ile Thr Leu His Leu Met
 195 200 205

Lys Ala Phe Gly Val Asp Val Val His Glu Asn Tyr Gln Ile Phe His
 210 215 220

Ile Lys Gly Gly Gln Thr Tyr Arg Ser Pro Gly Ile Tyr Leu Val Glu
 225 230 235 240

146

F

| 50 | | | | | 55 | | | | | 60 | | | | | |
|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|
| Gln | Leu | Ser | Asp | Asp | Lys | Thr | Ile | Cys | Glu | Ile | Glu | Gly | Leu | Gly | Gly |
| 65 | | | | | 70 | | | | | 75 | | | | | 80 |
| Ala | Phe | Asn | Ile | Gln | Asp | Asn | Leu | Ser | Leu | Phe | Leu | Gly | Asn | Ala | Gly |
| | | | | 85 | | | | | 90 | | | | | 95 | |
| Thr | Ala | Met | Arg | Pro | Leu | Thr | Ala | Ala | Leu | Cys | Leu | Lys | Gly | Asn | His |
| | | | 100 | | | | | 105 | | | | | 110 | | |
| Glu | Val | Glu | Ile | Ile | Leu | Thr | Gly | Glu | Pro | Arg | Met | Lys | Glu | Arg | Pro |
| | 115 | | | | | | 120 | | | | | 125 | | | |
| Ile | Leu | His | Leu | Val | Asp | Ala | Leu | Arg | Gln | Ala | Gly | Ala | Asp | Ile | Arg |
| | 130 | | | | | 135 | | | | | 140 | | | | |
| Tyr | Leu | Glu | Asn | Glu | Gly | Tyr | Pro | Pro | Leu | Ala | Ile | Arg | Asn | Lys | Gly |
| 145 | | | | | 150 | | | | | 155 | | | | | 160 |
| Ile | Lys | Gly | Gly | Lys | Val | Lys | Ile | Asp | Gly | Ser | Ile | Ser | Ser | Gln | Phe |
| | | | | 165 | | | | | 170 | | | | | 175 | |
| Leu | Thr | Ala | Leu | Leu | Met | Ser | Ala | Pro | Leu | Ala | Glu | Asn | Asp | Thr | Glu |
| | | | 180 | | | | | 185 | | | | | 190 | | |
| Ile | Glu | Ile | Ile | Gly | Glu | Leu | Val | Ser | Lys | Pro | Tyr | Ile | Asp | Ile | Thr |
| | 195 | | | | | | 200 | | | | | 205 | | | |
| Leu | Ala | Met | Met | Arg | Asp | Phe | Gly | Val | Lys | Val | Glu | Asn | His | His | Tyr |
| | 210 | | | | | 215 | | | | | 220 | | | | |
| Gln | Lys | Phe | Gln | Val | Lys | Gly | Asn | Gln | Ser | Tyr | Ile | Ser | Pro | Asn | Lys |
| 225 | | | | | 230 | | | | | 235 | | | | | 240 |
| Tyr | Leu | Val | Glu | Gly | Asp | Ala | Ser | Ser | Ala | Ser | Tyr | Phe | Leu | Ala | Ala |
| | | | 245 | | | | | | 250 | | | | | 255 | |
| Gly | Ala | Ile | Lys | Gly | Lys | Val | Lys | Val | Thr | Gly | Ile | Gly | Lys | Asn | Ser |
| | | | 260 | | | | | 265 | | | | | 270 | | |
| Ile | Gln | Gly | Asp | Arg | Leu | Phe | Ala | Asp | Val | Leu | Glu | Lys | Met | Gly | Ala |
| | 275 | | | | | | 280 | | | | | 285 | | | |
| Lys | Ile | Thr | Trp | Gly | Glu | Asp | Phe | Ile | Gln | Ala | Glu | His | Ala | Glu | Leu |
| | 290 | | | | | 295 | | | | | 300 | | | | |
| Asn | Gly | Ile | Asp | Met | Asp | Met | Asn | His | Ile | Pro | Asp | Ala | Ala | Met | Thr |
| 305 | | | | | 310 | | | | | 315 | | | | | 320 |
| Ile | Ala | Thr | Thr | Ala | Leu | Phe | Ser | Asn | Gly | Glu | Thr | Val | Ile | Arg | Asn |
| | | | | 325 | | | | | 330 | | | | | 335 | |
| Ile | Tyr | Asn | Trp | Arg | Val | Lys | Glu | Thr | Asp | Arg | Leu | Thr | Ala | Met | Ala |

1108

7

| | | |
|---|---------|---------|
| 340 | 345 | 350 |
| Thr Glu Leu Arg Lys Val Gly Ala Glu Val Glu Glu Gly Glu Asp Phe | | |
| 355 | 360 | 365 |
| Ile Arg Ile Gln Pro Leu Ala Leu Asn Gln Phe Lys His Ala Asn Ile | | |
| 370 | 375 | 380 |
| Glu Thr Tyr Asn Asp His Arg Met Ala Met Cys Phe Ser Leu Ile Ala | | |
| 385 | 390 | 395 400 |
| Leu Ser Asn Thr Pro Val Thr Ile Leu Asp Pro Lys Cys Thr Ala Lys | | |
| | 405 410 | 415 |
| Thr Phe Pro Thr Phe Phe Asn Glu Phe Glu Lys Ile Cys Leu Lys Asn | | |
| | 420 425 | 430 |
| <210> 62 | | |
| <211> 441 | | |
| <212> PRT | | |
| <213> Pasteurella multocida | | |
| <400> 62 | | |
| Val Ile Lys Asp Ala Thr Ala Ile Thr Leu Asn Pro Ile Ser Tyr Ile | | |
| 1 | 5 10 | 15 |
| Glu Gly Glu Val Arg Leu Pro Gly Ser Lys Ser Leu Ser Asn Arg Ala | | |
| | 20 25 | 30 |
| Leu Leu Leu Ser Ala Leu Ala Lys Gly Lys Thr Thr Leu Thr Asn Leu | | |
| | 35 40 | 45 |
| Leu Asp Ser Asp Asp Val Arg His Met Leu Asn Ala Leu Lys Glu Leu | | |
| | 50 55 | 60 |
| Gly Val Thr Tyr Gln Leu Ser Glu Asp Lys Ser Val Cys Glu Ile Glu | | |
| 65 | 70 75 | 80 |
| Gly Leu Gly Arg Ala Phe Glu Trp Gln Ser Gly Leu Ala Leu Phe Leu | | |
| | 85 90 | 95 |
| Gly Asn Ala Gly Thr Ala Met Arg Pro Leu Thr Ala Ala Leu Cys Leu | | |
| | 100 105 | 110 |
| Ser Thr Pro Asn Arg Glu Gly Lys Asn Glu Ile Val Leu Thr Gly Glu | | |
| | 115 120 | 125 |
| Pro Arg Met Lys Glu Arg Pro Ile Gln His Leu Val Asp Ala Leu Cys | | |
| | 130 135 | 140 |
| Gln Ala Gly Ala Glu Ile Gln Tyr Leu Glu Gln Glu Gly Tyr Pro Pro | | |
| 145 | 150 155 | 160 |

| | | | | | | | | | | | | | | | | | | |
|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|
| Ile | Ala | Ile | Arg | Asn | Thr | Gly | Leu | Lys | Gly | Gly | Arg | Ile | Gln | Ile | Asp | 165 | 170 | 175 |
| Gly | Ser | Val | Ser | Ser | Gln | Phe | Leu | Thr | Ala | Leu | Leu | Met | Ala | Ala | Pro | 180 | 185 | 190 |
| Met | Ala | Glu | Ala | Asp | Thr | Glu | Ile | Glu | Ile | Ile | Gly | Glu | Leu | Val | Ser | 195 | 200 | 205 |
| Lys | Pro | Tyr | Ile | Asp | Ile | Thr | Leu | Lys | Met | Met | Gln | Thr | Phe | Gly | Val | 210 | 215 | 220 |
| Glu | Val | Glu | Asn | Gln | Ala | Tyr | Gln | Arg | Phe | Leu | Val | Lys | Gly | His | Gln | 225 | 230 | 235 |
| Gln | Tyr | Gln | Ser | Pro | His | Arg | Phe | Leu | Val | Glu | Gly | Asp | Ala | Ser | Ser | 245 | 250 | 255 |
| Ala | Ser | Tyr | Phe | Leu | Ala | Ala | Ala | Ala | Ile | Lys | Gly | Lys | Val | Lys | Val | 260 | 265 | 270 |
| Thr | Gly | Val | Gly | Lys | Asn | Ser | Ile | Gln | Gly | Asp | Arg | Leu | Phe | Ala | Asp | 275 | 280 | 285 |
| Val | Leu | Glu | Lys | Met | Gly | Ala | His | Ile | Thr | Trp | Gly | Asp | Asp | Phe | Ile | 290 | 295 | 300 |
| Gln | Val | Glu | Lys | Gly | Asn | Leu | Lys | Gly | Ile | Asp | Met | Asp | Met | Asn | His | 305 | 310 | 315 |
| Ile | Pro | Asp | Ala | Ala | Met | Thr | Ile | Ala | Thr | Thr | Ala | Leu | Phe | Ala | Glu | 325 | 330 | 335 |
| Gly | Glu | Thr | Val | Ile | Arg | Asn | Ile | Tyr | Asn | Trp | Arg | Val | Lys | Glu | Thr | 340 | 345 | 350 |
| Asp | Arg | Leu | Thr | Ala | Met | Ala | Thr | Glu | Leu | Arg | Lys | Val | Gly | Ala | Glu | 355 | 360 | 365 |
| Val | Glu | Glu | Gly | Glu | Asp | Phe | Ile | Arg | Ile | Gln | Pro | Leu | Asn | Leu | Ala | 370 | 375 | 380 |
| Gln | Phe | Gln | His | Ala | Glu | Leu | Asn | Ile | His | Asp | His | Arg | Met | Ala | Met | 385 | 390 | 395 |
| Cys | Phe | Ala | Leu | Ile | Ala | Leu | Ser | Lys | Thr | Ser | Val | Thr | Ile | Leu | Asp | 405 | 410 | 415 |
| Pro | Ser | Cys | Thr | Ala | Lys | Thr | Phe | Pro | Thr | Phe | Leu | Ile | Leu | Phe | Thr | 420 | 425 | 430 |
| Leu | Asn | Thr | Arg | Glu | Val | Ala | Tyr | Arg | | | | | | | | 435 | 440 | |

170

7

<210> 63
 <211> 426
 <212> PRT
 <213> Aeromonas salmonicida

<400> 63

Asn Ser Leu Arg Leu Glu Pro Ile Ser Arg Val Ala Gly Glu Val Asn
 1 5 10 15

Leu Pro Gly Ser Lys Ser Val Ser Asn Arg Ala Leu Leu Leu Ala Ala
 20 25 30

Leu Ala Arg Gly Thr Thr Arg Leu Thr Asn Leu Leu Asp Ser Asp Asp
 35 40 45

Ile Arg His Met Leu Ala Ala Leu Thr Gln Leu Gly Val Lys Tyr Lys
 50 55 60

Leu Ser Ala Asp Lys Thr Glu Cys Thr Val His Gly Leu Gly Arg Ser
 65 70 75 80

Phe Ala Val Ser Ala Pro Val Asn Leu Phe Leu Gly Asn Ala Gly Thr
 85 90 95

Ala Met Arg Pro Leu Cys Ala Ala Leu Cys Leu Gly Ser Gly Glu Tyr
 100 105 110

Met Leu Gly Gly Glu Pro Arg Met Glu Glu Arg Pro Ile Gly His Leu
 115 120 125

Val Asp Cys Leu Ala Leu Lys Gly Ala His Ile Gln Tyr Leu Lys Lys
 130 135 140

Asp Gly Tyr Pro Pro Leu Val Val Asp Ala Lys Gly Leu Trp Gly Gly
 145 150 155 160

Asp Val His Val Asp Gly Ser Val Ser Ser Gln Phe Leu Thr Ala Phe
 165 170 175

Leu Met Ala Ala Pro Ala Met Ala Pro Val Ile Pro Arg Ile His Ile
 180 185 190

Lys Gly Glu Leu Val Ser Lys Pro Tyr Ile Asp Ile Thr Leu His Ile
 195 200 205

Met Asn Ser Ser Gly Val Val Ile Glu His Asp Asn Tyr Lys Leu Phe
 210 215 220

Tyr Ile Lys Gly Asn Gln Ser Ile Val Ser Pro Gly Asp Phe Leu Val
 225 230 235 240

Glu Gly Asp Ala Ser Ser Ala Ser Tyr Phe Leu Ala Ala Gly Ala Ile
 245 250 255

171

Lys Gly Lys Val Arg Val Thr Gly Ile Gly Lys His Ser Ile Gly Asp
 260 265 270
 Ile His Phe Ala Asp Val Leu Glu Arg Met Gly Ala Arg Ile Thr Trp
 275 280 285
 Gly Asp Asp Phe Ile Glu Ala Glu Gln Gly Pro Leu His Gly Val Asp
 290 295 300
 Met Asp Met Asn His Ile Pro Asp Val Gly His Asp His Ser Gly Gln
 305 310 315 320
 Ser His Cys Leu Pro Arg Val Pro Pro His Ser Gln His Leu Gln Leu
 325 330 335
 Ala Val Arg Asp Asp Arg Cys Thr Pro Cys Thr His Gly His Arg Arg
 340 345 350
 Ala Gln Ala Gly Val Ser Glu Glu Gly Thr Thr Phe Ile Thr Arg Asp
 355 360 365
 Ala Ala Asp Pro Ala Gln Ala Arg Arg Asp Arg His Leu Gln Arg Ser
 370 375 380
 Arg Ile Ala Met Cys Phe Ser Leu Val Ala Leu Ser Asp Ile Ala Val
 385 390 395 400
 Thr Ile Asn Asp Pro Gly Cys Thr Ser Lys Thr Phe Pro Asp Tyr Phe
 405 410 415
 Asp Lys Leu Ala Ser Val Ser Gln Ala Val
 420 425

<210> 64
 <211> 442
 <212> PRT
 <213> Bacillus pertussis

<400> 64

Met Ser Gly Leu Ala Tyr Leu Asp Leu Pro Ala Ala Arg Leu Ala Arg
 1 5 10 15
 Gly Glu Val Ala Leu Pro Gly Ser Lys Ser Ile Ser Asn Arg Val Leu
 20 25 30
 Leu Leu Ala Ala Leu Ala Glu Gly Ser Thr Glu Ile Thr Gly Leu Leu
 35 40 45
 Asp Ser Asp Asp Thr Arg Val Met Leu Ala Ala Leu Arg Gln Leu Gly
 50 55 60
 Val Ser Val Gly Glu Val Ala Asp Gly Cys Val Thr Ile Glu Gly Val

172

7

| | | | | | | |
|---|-----|----|-----|----|-----|-----|
| 65 | | 70 | | 75 | | 80 |
| Ala Arg Phe Pro Thr Glu Gln Ala Glu Leu Phe Leu Gly Asn Ala Gly | | | | | | |
| | 85 | | 90 | | 95 | |
| Thr Ala Phe Arg Pro Leu Thr Ala Ala Leu Ala Leu Met Gly Gly Asp | | | | | | |
| | 100 | | 105 | | 110 | |
| Tyr Arg Leu Ser Gly Val Pro Arg Met His Glu Arg Pro Ile Gly Asp | | | | | | |
| | 115 | | 120 | | 125 | |
| Leu Val Asp Ala Leu Arg Gln Phe Gly Ala Gly Ile Glu Tyr Leu Gly | | | | | | |
| | 130 | | 135 | | 140 | |
| Gln Ala Gly Tyr Pro Pro Leu Arg Ile Gly Gly Gly Ser Ile Arg Val | | | | | | |
| | 145 | | 150 | | 155 | 160 |
| Asp Gly Pro Val Arg Val Glu Gly Ser Val Ser Ser Gln Phe Leu Thr | | | | | | |
| | 165 | | 170 | | 175 | |
| Ala Leu Leu Met Ala Ala Pro Val Leu Ala Arg Arg Ser Gly Gln Asp | | | | | | |
| | 180 | | 185 | | 190 | |
| Ile Thr Ile Glu Val Val Gly Glu Leu Ile Ser Lys Pro Tyr Ile Glu | | | | | | |
| | 195 | | 200 | | 205 | |
| Ile Thr Leu Asn Leu Met Ala Arg Phe Gly Val Ser Val Arg Arg Asp | | | | | | |
| | 210 | | 215 | | 220 | |
| Gly Trp Arg Ala Phe Thr Ile Ala Arg Asp Ala Val Tyr Arg Gly Pro | | | | | | |
| | 225 | | 230 | | 235 | 240 |
| Gly Arg Met Ala Ile Glu Gly Asp Ala Ser Thr Ala Ser Tyr Phe Leu | | | | | | |
| | 245 | | 250 | | 255 | |
| Ala Leu Gly Ala Ile Gly Gly Gly Pro Val Arg Val Thr Gly Val Gly | | | | | | |
| | 260 | | 265 | | 270 | |
| Glu Asp Ser Ile Gln Gly Asp Val Ala Phe Ala Ala Thr Leu Ala Ala | | | | | | |
| | 275 | | 280 | | 285 | |
| Met Gly Ala Asp Val Arg Tyr Gly Pro Gly Trp Ile Glu Thr Arg Gly | | | | | | |
| | 290 | | 295 | | 300 | |
| Val Arg Val Ala Glu Gly Gly Arg Leu Lys Ala Phe Asp Ala Asp Phe | | | | | | |
| | 305 | | 310 | | 315 | 320 |
| Asn Leu Ile Pro Asp Ala Ala Met Thr Ala Ala Thr Leu Ala Leu Tyr | | | | | | |
| | 325 | | 330 | | 335 | |
| Ala Asp Gly Pro Cys Arg Leu Arg Asn Ile Gly Ser Trp Arg Val Lys | | | | | | |
| | 340 | | 345 | | 350 | |
| Glu Thr Asp Arg Ile His Ala Met His Thr Glu Leu Glu Lys Leu Gly | | | | | | |

173

7

355

360

365

Ala Gly Val Gln Ser Gly Ala Asp Trp Leu Glu Val Ala Pro Pro Glu
370 375 380

Pro Gly Gly Trp Arg Asp Ala His Ile Gly Thr Trp Asp Asp His Arg
385 390 395 400

Met Ala Met Cys Phe Leu Leu Ala Ala Phe Gly Pro Ala Ala Val Arg
405 410 415

Ile Leu Asp Pro Gly Cys Val Ser Lys Thr Phe Pro Asp Tyr Phe Asp
420 425 430

Val Tyr Ala Gly Leu Leu Ala Ala Arg Asp
435 440

<210> 65

<211> 427

<212> PRT

<213> Salmonella typhimurium

<400> 65

Met Glu Ser Leu Thr Leu Gln Pro Ile Ala Arg Val Asp Gly Ala Ile
1 5 10 15

Asn Leu Pro Gly Ser Lys Ser Val Ser Asn Arg Ala Leu Leu Ala
20 25 30

Ala Leu Ala Cys Gly Lys Thr Val Leu Thr Asn Leu Leu Asp Ser Asp
35 40 45

Asp Val Arg His Met Leu Asn Ala Leu Ser Ala Leu Gly Ile Asn Tyr
50 55 60

Thr Leu Ser Ala Asp Arg Thr Arg Cys Asp Ile Thr Gly Asn Gly Gly
65 70 75 80

Pro Leu Arg Ala Ser Gly Thr Leu Glu Leu Phe Leu Gly Asn Ala Gly
85 90 95

Thr Ala Met Arg Pro Leu Ala Ala Ala Leu Cys Leu Gly Gln Asn Glu
100 105 110

Ile Val Leu Thr Gly Glu Pro Arg Met Lys Glu Arg Pro Ile Gly His
115 120 125

Leu Val Asp Ser Leu Arg Gln Gly Gly Ala Asn Ile Asp Tyr Leu Glu
130 135 140

Gln Glu Asn Tyr Pro Pro Leu Arg Leu Arg Gly Gly Phe Ile Gly Gly
145 150 155 160

| | | | | | | | | | | | | | | | | | | |
|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|
| Asp | Ile | Glu | Val | Asp | Gly | Ser | Val | Ser | Ser | Gln | Phe | Leu | Thr | Ala | Leu | 165 | 170 | 175 |
| Leu | Met | Thr | Ala | Pro | Leu | Ala | Pro | Glu | Asp | Thr | Ile | Ile | Arg | Val | Lys | 180 | 185 | 190 |
| Gly | Glu | Leu | Val | Ser | Lys | Pro | Tyr | Ile | Asp | Ile | Thr | Leu | Asn | Leu | Met | 195 | 200 | 205 |
| Lys | Thr | Phe | Gly | Val | Glu | Ile | Ala | Asn | His | His | Tyr | Gln | Gln | Phe | Val | 210 | 215 | 220 |
| Val | Lys | Gly | Gly | Gln | Gln | Tyr | His | Ser | Pro | Gly | Arg | Tyr | Leu | Val | Glu | 225 | 230 | 235 |
| Gly | Asp | Ala | Ser | Ser | Ala | Ser | Tyr | Phe | Leu | Ala | Ala | Gly | Gly | Ile | Lys | 245 | 250 | 255 |
| Gly | Gly | Thr | Val | Lys | Val | Thr | Gly | Ile | Gly | Gly | Lys | Ser | Met | Gln | Gly | 260 | 265 | 270 |
| Asp | Ile | Arg | Phe | Ala | Asp | Val | Leu | His | Lys | Met | Gly | Ala | Thr | Ile | Thr | 275 | 280 | 285 |
| Trp | Gly | Asp | Asp | Phe | Ile | Ala | Cys | Thr | Arg | Gly | Glu | Leu | His | Ala | Ile | 290 | 295 | 300 |
| Asp | Met | Asp | Met | Asn | His | Ile | Pro | Asp | Ala | Ala | Met | Thr | Ile | Ala | Thr | 305 | 310 | 315 |
| Thr | Ala | Leu | Phe | Ala | Lys | Gly | Thr | Thr | Thr | Leu | Arg | Asn | Ile | Tyr | Asn | 325 | 330 | 335 |
| Trp | Arg | Val | Lys | Glu | Thr | Asp | Arg | Leu | Phe | Ala | Met | Ala | Thr | Glu | Leu | 340 | 345 | 350 |
| Arg | Lys | Val | Gly | Ala | Glu | Val | Glu | Glu | Gly | His | Asp | Tyr | Ile | Arg | Ile | 355 | 360 | 365 |
| Thr | Pro | Pro | Ala | Lys | Leu | Gln | His | Ala | Asp | Ile | Gly | Thr | Tyr | Asn | Asp | 370 | 375 | 380 |
| His | Arg | Met | Ala | Met | Cys | Phe | Ser | Leu | Val | Ala | Leu | Ser | Asp | Thr | Pro | 385 | 390 | 395 |
| Val | Thr | Ile | Leu | Asp | Pro | Lys | Cys | Thr | Ala | Lys | Thr | Phe | Pro | Asp | Tyr | 405 | 410 | 415 |
| Phe | Glu | Gln | Leu | Ala | Arg | Met | Ser | Thr | Pro | Ala | | | | | | 420 | 425 | |

<210> 66
 <211> 1894
 <212> DNA

115

F

<213> Synechocystis sp.

<220>

<221> CDS

<222> (275)..(1618)

<400> 66

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| acgggctgta acggtagtag ggggtcccgag cacaaaagcg gtgccggcaa gcagaactaa | 60 |
| tttccatggg gaataatggg atttcattgg tttggcctct ggtctggcaa tggttgctag | 120 |
| gcgatcgctt gttgaaatta acaaactgtc gcccttccac tgaccatggg aacgatgttt | 180 |
| tttacttcct tgactaaccg aggaaaattt ggcggggggc agaaatgcca atacaattta | 240 |
| gcttgggtctt cctgccccct aatttgtccc ctcc atg gcc ttg ctt tcc ctc aac | 295 |
| Met Ala Leu Leu Ser Leu Asn | |
| 1 5 | |
| aat cat caa tcc cat caa cgc tta act gtt aat ccc cct gcc caa ggg | 343 |
| Asn His Gln Ser His Gln Arg Leu Thr Val Asn Pro Pro Ala Gln Gly | |
| 10 15 20 | |
| gtc gct ttg act ggc cgc cta agg gtg ccg ggg gat aaa tcc att tcc | 391 |
| Val Ala Leu Thr Gly Arg Leu Arg Val Pro Gly Asp Lys Ser Ile Ser | |
| 25 30 35 | |
| cat cgg gcc ttg atg ttg ggg gcg atc gcc acc ggg gaa acc att atc | 439 |
| His Arg Ala Leu Met Leu Gly Ala Ile Ala Thr Gly Glu Thr Ile Ile | |
| 40 45 50 55 | |
| gaa ggg cta ctg ttg ggg gaa gat ccc cgt agt acg gcc cat tgc ttt | 487 |
| Glu Gly Leu Leu Leu Gly Glu Asp Pro Arg Ser Thr Ala His Cys Phe | |
| 60 65 70 | |
| cgg gcc atg gga gca gaa atc agc gaa cta aat tca gaa aaa atc atc | 535 |
| Arg Ala Met Gly Ala Glu Ile Ser Glu Leu Asn Ser Glu Lys Ile Ile | |
| 75 80 85 | |
| gtt cag ggt cgg ggt ctg gga cag ttg cag gaa ccc agt acc gtt ttg | 583 |
| Val Gln Gly Arg Gly Leu Gly Gln Leu Gln Glu Pro Ser Thr Val Leu | |
| 90 95 100 | |
| gat gcg ggg aac tct ggc acc acc atg cgc tta atg ttg ggc ttg cta | 631 |
| Asp Ala Gly Asn Ser Gly Thr Thr Met Arg Leu Met Leu Gly Leu Leu | |
| 105 110 115 | |
| gcc ggg caa aaa gat tgt tta ttc acc gtc acc ggc gat gat tcc ctc | 679 |
| Ala Gly Gln Lys Asp Cys Leu Phe Thr Val Thr Gly Asp Asp Ser Leu | |
| 120 125 130 135 | |
| cgt cac cgc ccc atg tcc cgg gta att caa ccc ttg caa caa atg ggg | 727 |
| Arg His Arg Pro Met Ser Arg Val Ile Gln Pro Leu Gln Gln Met Gly | |
| 140 145 150 | |

| | |
|---|------|
| gca aaa att tgg gcc cgg agt aac ggc aag ttt gcg ccg ctg gca gtc | 775 |
| Ala Lys Ile Trp Ala Arg Ser Asn Gly Lys Phe Ala Pro Leu Ala Val | |
| 155 160 165 | |
| cag ggt agc caa tta aaa ccg atc cat tac cat tcc ccc att gct tca | 823 |
| Gln Gly Ser Gln Leu Lys Pro Ile His Tyr His Ser Pro Ile Ala Ser | |
| 170 175 180 | |
| gcc cag gta aag tcc tgc ctg ttg cta gcg ggg tta acc acc gag ggg | 871 |
| Ala Gln Val Lys Ser Cys Leu Leu Leu Ala Gly Leu Thr Thr Glu Gly | |
| 185 190 195 | |
| gac acc acg gtt aca gaa cca gct cta tcc cgg gat cat agc gaa cgc | 919 |
| Asp Thr Thr Val Thr Glu Pro Ala Leu Ser Arg Asp His Ser Glu Arg | |
| 200 205 210 215 | |
| atg ttg cag gcc ttt gga gcc aaa tta acc att gat cca gta acc cat | 967 |
| Met Leu Gln Ala Phe Gly Ala Lys Leu Thr Ile Asp Pro Val Thr His | |
| 220 225 230 | |
| agc gtc act gtc cat ggc ccg gcc cat tta acg ggg caa cgg gtg gtg | 1015 |
| Ser Val Thr Val His Gly Pro Ala His Leu Thr Gly Gln Arg Val Val | |
| 235 240 245 | |
| gtg cca ggg gac atc agc tcg gcg gcc ttt tgg tta gtg gcg gca tcc | 1063 |
| Val Pro Gly Asp Ile Ser Ser Ala Ala Phe Trp Leu Val Ala Ala Ser | |
| 250 255 260 | |
| att ttg cct gga tca gaa ttg ttg gtg gaa aat gta ggc att aac ccc | 1111 |
| Ile Leu Pro Gly Ser Glu Leu Leu Val Glu Asn Val Gly Ile Asn Pro | |
| 265 270 275 | |
| acc agg aca ggg gtg ttg gaa gtg ttg gcc cag atg ggg gcg gac att | 1159 |
| Thr Arg Thr Gly Val Leu Glu Val Leu Ala Gln Met Gly Ala Asp Ile | |
| 280 285 290 295 | |
| acc ccg gag aat gaa cga ttg gta acg ggg gaa ccg gta gca gat ctg | 1207 |
| Thr Pro Glu Asn Glu Arg Leu Val Thr Gly Glu Pro Val Ala Asp Leu | |
| 300 305 310 | |
| cgg gtt agg gca agc cat ctc cag ggt tgc acc ttc ggc ggc gaa att | 1255 |
| Arg Val Arg Ala Ser His Leu Gln Gly Cys Thr Phe Gly Gly Glu Ile | |
| 315 320 325 | |
| att ccc cga ctg att gat gaa att ccc att ttg gca gtg gcg gcg gcc | 1303 |
| Ile Pro Arg Leu Ile Asp Glu Ile Pro Ile Leu Ala Val Ala Ala Ala | |
| 330 335 340 | |
| ttt gca gag ggc act acc cgc att gaa gat gcc gca gaa ctg agg gtt | 1351 |
| Phe Ala Glu Gly Thr Thr Arg Ile Glu Asp Ala Ala Glu Leu Arg Val | |
| 345 350 355 | |
| aaa gaa agc gat cgc ctg gcg gcc att gct tcg gag ttg ggc aaa atg | 1399 |

Lys Glu Ser Asp Arg Leu Ala Ala Ile Ala Ser Glu Leu Gly Lys Met
 360 365 370 375
 ggg gcc aaa gtc acc gaa ttt gat gat ggc ctg gaa att caa ggg gga 1447
 Gly Ala Lys Val Thr Glu Phe Asp Asp Gly Leu Glu Ile Gln Gly Gly
 380 385 390
 agc ccg tta caa ggg gcc gag gtg gat agc ttg acg gat cat cgc att 1495
 Ser Pro Leu Gln Gly Ala Glu Val Asp Ser Leu Thr Asp His Arg Ile
 395 400 405
 gcc atg gcg ttg gcg atc gcc gct tta ggt agt ggg ggg caa aca att 1543
 Ala Met Ala Leu Ala Ile Ala Ala Leu Gly Ser Gly Gly Gln Thr Ile
 410 415 420
 att aac cgg gcg gaa gcg gcc gcc att tcc tat cca gaa ttt ttt ggc 1591
 Ile Asn Arg Ala Glu Ala Ala Ala Ile Ser Tyr Pro Glu Phe Phe Gly
 425 430 435
 acg cta ggg caa gtt gcc caa gga taa agttagaaaa actcctgggc 1638
 Thr Leu Gly Gln Val Ala Gln Gly
 440 445
 ggtttgtaaa tgttttacca aggtagtttg gggtaaaggc cccagcaagt gctgccaggg 1698
 taatttatcc gcaattgacc aatcggcattg gaccgtatcg ttcaaactgg gtaattctcc 1758
 ctttaattcc ttaaaagctc gcttaaaaact gcccaacgta tctccgtaat ggcgagtgag 1818
 tagaagtaat ggggccaaac ggcgatcgcc acgggaaatt aaagcctgca tcaactgacca 1878
 cttataactt tcggga 1894

<210> 67
 <211> 447
 <212> PRT
 <213> Synechocystis sp.

<400> 67

Met Ala Leu Leu Ser Leu Asn Asn His Gln Ser His Gln Arg Leu Thr
 1 5 10 15

Val Asn Pro Pro Ala Gln Gly Val Ala Leu Thr Gly Arg Leu Arg Val
 20 25 30

Pro Gly Asp Lys Ser Ile Ser His Arg Ala Leu Met Leu Gly Ala Ile
 35 40 45

Ala Thr Gly Glu Thr Ile Ile Glu Gly Leu Leu Leu Gly Glu Asp Pro

50

55

60

Arg Ser Thr Ala His Cys Phe Arg Ala Met Gly Ala Glu Ile Ser Glu
65 70 75 80

Leu Asn Ser Glu Lys Ile Ile Val Gln Gly Arg Gly Leu Gly Gln Leu
85 90 95

Gln Glu Pro Ser Thr Val Leu Asp Ala Gly Asn Ser Gly Thr Thr Met
100 105 110

Arg Leu Met Leu Gly Leu Leu Ala Gly Gln Lys Asp Cys Leu Phe Thr
115 120 125

Val Thr Gly Asp Asp Ser Leu Arg His Arg Pro Met Ser Arg Val Ile
130 135 140

Gln Pro Leu Gln Gln Met Gly Ala Lys Ile Trp Ala Arg Ser Asn Gly
145 150 155 160

Lys Phe Ala Pro Leu Ala Val Gln Gly Ser Gln Leu Lys Pro Ile His
165 170 175

Tyr His Ser Pro Ile Ala Ser Ala Gln Val Lys Ser Cys Leu Leu Leu
180 185 190

Ala Gly Leu Thr Thr Glu Gly Asp Thr Thr Val Thr Glu Pro Ala Leu
195 200 205

Ser Arg Asp His Ser Glu Arg Met Leu Gln Ala Phe Gly Ala Lys Leu
210 215 220

Thr Ile Asp Pro Val Thr His Ser Val Thr Val His Gly Pro Ala His
225 230 235 240

Leu Thr Gly Gln Arg Val Val Val Pro Gly Asp Ile Ser Ser Ala Ala
245 250 255

Phe Trp Leu Val Ala Ala Ser Ile Leu Pro Gly Ser Glu Leu Leu Val
260 265 270

Glu Asn Val Gly Ile Asn Pro Thr Arg Thr Gly Val Leu Glu Val Leu
275 280 285

Ala Gln Met Gly Ala Asp Ile Thr Pro Glu Asn Glu Arg Leu Val Thr
290 295 300

Gly Glu Pro Val Ala Asp Leu Arg Val Arg Ala Ser His Leu Gln Gly
305 310 315 320

Cys Thr Phe Gly Gly Glu Ile Ile Pro Arg Leu Ile Asp Glu Ile Pro
325 330 335

Ile Leu Ala Val Ala Ala Ala Phe Ala Glu Gly Thr Thr Arg Ile Glu
340 345 350

Asp Ala Ala Glu Leu Arg Val Lys Glu Ser Asp Arg Leu Ala Ala Ile
355 360 365

Ala Ser Glu Leu Gly Lys Met Gly Ala Lys Val Thr Glu Phe Asp Asp
370 375 380

Gly Leu Glu Ile Gln Gly Gly Ser Pro Leu Gln Gly Ala Glu Val Asp
385 390 395 400

Ser Leu Thr Asp His Arg Ile Ala Met Ala Leu Ala Ile Ala Ala Leu
405 410 415

Gly Ser Gly Gly Gln Thr Ile Ile Asn Arg Ala Glu Ala Ala Ala Ile
420 425 430

Ser Tyr Pro Glu Phe Phe Gly Thr Leu Gly Gln Val Ala Gln Gly
435 440 445

<210> 68
<211> 1479
<212> DNA
<213> Dichelobacter nodosus

<220>
<221> CDS
<222> (107) .. (1438)

<400> 68
 tttaaaaaca atgagttaaa aaattatattt tctggcacac gcgctttttt tgcatttttt 60
 ctcccatttt tccggcacaa taacgttggt ttataaaaag gaaatg atg atg acg 115
 Met Met Thr
 1
 aat ata tgg cac acc gcg ccc gtc tct gcg ctt tcc ggc gaa ata acg 163
 Asn Ile Trp His Thr Ala Pro Val Ser Ala Leu Ser Gly Glu Ile Thr
 5 10 15
 ata tgc ggc gat aaa tca atg tgc cat cgc gcc tta tta tta gca gcg 211
 Ile Cys Gly Asp Lys Ser Met Ser His Arg Ala Leu Leu Leu Ala Ala
 20 25 30 35
 tta gca gaa gga caa acg gaa atc cgc ggc ttt tta gcg tgc gcg gat 259
 Leu Ala Glu Gly Gln Thr Glu Ile Arg Gly Phe Leu Ala Cys Ala Asp
 40 45 50
 tgt ttg gcg acg cgg caa gca ttg cgc gca tta ggc gtt gat att caa 307
 Cys Leu Ala Thr Arg Gln Ala Leu Arg Ala Leu Gly Val Asp Ile Gln
 55 60 65
 aga gaa aaa gaa ata gtg acg att cgc ggt gtg gga ttt ctg ggt ttg 355
 Arg Glu Lys Glu Ile Val Thr Ile Arg Gly Val Gly Phe Leu Gly Leu
 70 75 80
 cag ccg ccg aaa gca ccg tta aat atg caa aac agt ggc act agc atg 403
 Gln Pro Pro Lys Ala Pro Leu Asn Met Gln Asn Ser Gly Thr Ser Met
 85 90 95
 cgt tta ttg gca gga att ttg gca gcg cag cgc ttt gag agc gtg tta 451
 Arg Leu Leu Ala Gly Ile Leu Ala Ala Gln Arg Phe Glu Ser Val Leu
 100 105 110 115
 tgc ggc gat gaa tca tta gaa aaa cgt ccg atg cag cgc att att acg 499
 Cys Gly Asp Glu Ser Leu Glu Lys Arg Pro Met Gln Arg Ile Ile Thr
 120 125 130
 ccg ctt gtg caa atg ggg gca aaa att gtc agt cac agc aat ttt acg 547
 Pro Leu Val Gln Met Gly Ala Lys Ile Val Ser His Ser Asn Phe Thr
 135 140 145
 gcg ccg tta cat att tca gga cgc ccg ctg acc ggc att gat tac gcg 595
 Ala Pro Leu His Ile Ser Gly Arg Pro Leu Thr Gly Ile Asp Tyr Ala
 150 155 160
 tta ccg ctt ccc agc gcg caa tta aaa agt tgc ctt att ttg gca gga 643
 Leu Pro Leu Pro Ser Ala Gln Leu Lys Ser Cys Leu Ile Leu Ala Gly
 165 170 175
 tta ttg gct gac ggt acc acg ccg ctg cat act tgc ggc atc agt cgc 691
 Leu Leu Ala Asp Gly Thr Thr Arg Leu His Thr Cys Gly Ile Ser Arg
 180 185 190 195

181

A

| | |
|---|------|
| gac cac acg gaa cgc atg ttg ccg ctt ttt ggt ggc gca ctt gag atc | 739 |
| Asp His Thr Glu Arg Met Leu Pro Leu Phe Gly Gly Ala Leu Glu Ile | |
| 200 205 210 | |
| aag aaa gag caa ata atc gtc acc ggt gga caa aaa ttg cac ggt tgc | 787 |
| Lys Lys Glu Gln Ile Ile Val Thr Gly Gly Gln Lys Leu His Gly Cys | |
| 215 220 225 | |
| gtg ctt gat att gtc ggc gat ttg tgc gcg gcg gcg ttt ttt atg gtt | 835 |
| Val Leu Asp Ile Val Gly Asp Leu Ser Ala Ala Ala Phe Phe Met Val | |
| 230 235 240 | |
| gcg gct ttg att gcg ccg cgc gcg gaa gtc gtt att cgt aat gtc ggc | 883 |
| Ala Ala Leu Ile Ala Pro Arg Ala Glu Val Val Ile Arg Asn Val Gly | |
| 245 250 255 | |
| att aat ccg acg cgg gcg gca atc att act ttg ttg caa aaa atg ggc | 931 |
| Ile Asn Pro Thr Arg Ala Ala Ile Ile Thr Leu Leu Gln Lys Met Gly | |
| 260 265 270 275 | |
| gga cgg att gaa ttg cat cat cag cgc ttt tgg ggc gcc gaa ccg gtg | 979 |
| Gly Arg Ile Glu Leu His His Gln Arg Phe Trp Gly Ala Glu Pro Val | |
| 280 285 290 | |
| gca gat att gtt gtt tat cat tca aaa ttg cgc ggc att acg gtg gcg | 1027 |
| Ala Asp Ile Val Val Tyr His Ser Lys Leu Arg Gly Ile Thr Val Ala | |
| 295 300 305 | |
| ccg gaa tgg att gcc aac gcg att gat gaa ttg ccg att ttt ttt att | 1075 |
| Pro Glu Trp Ile Ala Asn Ala Ile Asp Glu Leu Pro Ile Phe Phe Ile | |
| 310 315 320 | |
| gcg gca gct tgc gcg gaa ggg acg act ttt gtg ggc aat ttg tca gaa | 1123 |
| Ala Ala Ala Cys Ala Glu Gly Thr Thr Phe Val Gly Asn Leu Ser Glu | |
| 325 330 335 | |
| ttg cgt gtg aaa gaa tgc gat cgt tta gcg gcg atg gcg caa aat tta | 1171 |
| Leu Arg Val Lys Glu Ser Asp Arg Leu Ala Ala Met Ala Gln Asn Leu | |
| 340 345 350 355 | |
| caa act ttg ggc gtg gcg tgc gac gtt ggc gcc gat ttt att cat ata | 1219 |
| Gln Thr Leu Gly Val Ala Cys Asp Val Gly Ala Asp Phe Ile His Ile | |
| 360 365 370 | |
| tat gga aga agc gat ccg caa ttt tta ccg gcg ccg gtg aac agt ttt | 1267 |
| Tyr Gly Arg Ser Asp Arg Gln Phe Leu Pro Ala Arg Val Asn Ser Phe | |
| 375 380 385 | |
| ggc gat cat ccg att gcg atg agt ttg gcg gtg gca ggt gtg cgc gcg | 1315 |
| Gly Asp His Arg Ile Ala Met Ser Leu Ala Val Ala Gly Val Arg Ala | |
| 390 395 400 | |
| gca ggt gaa tta ttg att gat gac ggc gcg gtg gcg gcg gtt tct atg | 1363 |

Ala Gly Glu Leu Leu Ile Asp Asp Gly Ala Val Ala Ala Val Ser Met
 405 410 415

ccg caa ttt cgc gat ttt gcc gcc gca att ggt atg aat gta gga gaa 1411
 Pro Gln Phe Arg Asp Phe Ala Ala Ala Ile Gly Met Asn Val Gly Glu
 420 425 430 435

aaa gat gcg aaa aat tgt cac gat tga tggctcctagc ggtgttgga 1458
 Lys Asp Ala Lys Asn Cys His Asp
 440

aaggcacggt ggcgcaagct t 1479

<210> 69
 <211> 443
 <212> PRT
 <213> Dichelobacter nodosus

<400> 69

Met Met Thr Asn Ile Trp His Thr Ala Pro Val Ser Ala Leu Ser Gly
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Glu Ile Thr Ile Cys Gly Asp Lys Ser Met Ser His Arg Ala Leu Leu
 20 25 30

Leu Ala Ala Leu Ala Glu Gly Gln Thr Glu Ile Arg Gly Phe Leu Ala
 35 40 45

Cys Ala Asp Cys Leu Ala Thr Arg Gln Ala Leu Arg Ala Leu Gly Val
 50 55 60

Asp Ile Gln Arg Glu Lys Glu Ile Val Thr Ile Arg Gly Val Gly Phe
 65 70 75 80

Leu Gly Leu Gln Pro Pro Lys Ala Pro Leu Asn Met Gln Asn Ser Gly
 85 90 95

Thr Ser Met Arg Leu Leu Ala Gly Ile Leu Ala Ala Gln Arg Phe Glu
 100 105 110

Ser Val Leu Cys Gly Asp Glu Ser Leu Glu Lys Arg Pro Met Gln Arg
 115 120 125

Ile Ile Thr Pro Leu Val Gln Met Gly Ala Lys Ile Val Ser His Ser

| | | | | |
|---|-----|-----|-----|---------|
| 130 | | 135 | | 140 |
| Asn Phe Thr Ala Pro Leu His Ile Ser Gly Arg Pro Leu Thr Gly Ile | | | | |
| 145 | | 150 | | 155 160 |
| Asp Tyr Ala Leu Pro Leu Pro Ser Ala Gln Leu Lys Ser Cys Leu Ile | | | | |
| | 165 | | 170 | 175 |
| Leu Ala Gly Leu Leu Ala Asp Gly Thr Thr Arg Leu His Thr Cys Gly | | | | |
| | 180 | | 185 | 190 |
| Ile Ser Arg Asp His Thr Glu Arg Met Leu Pro Leu Phe Gly Gly Ala | | | | |
| | 195 | | 200 | 205 |
| Leu Glu Ile Lys Lys Glu Gln Ile Ile Val Thr Gly Gly Gln Lys Leu | | | | |
| | 210 | | 215 | 220 |
| His Gly Cys Val Leu Asp Ile Val Gly Asp Leu Ser Ala Ala Ala Phe | | | | |
| | 225 | | 230 | 235 240 |
| Phe Met Val Ala Ala Leu Ile Ala Pro Arg Ala Glu Val Val Ile Arg | | | | |
| | 245 | | 250 | 255 |
| Asn Val Gly Ile Asn Pro Thr Arg Ala Ala Ile Ile Thr Leu Leu Gln | | | | |
| | 260 | | 265 | 270 |
| Lys Met Gly Gly Arg Ile Glu Leu His His Gln Arg Phe Trp Gly Ala | | | | |
| | 275 | | 280 | 285 |
| Glu Pro Val Ala Asp Ile Val Val Tyr His Ser Lys Leu Arg Gly Ile | | | | |
| | 290 | | 295 | 300 |
| Thr Val Ala Pro Glu Trp Ile Ala Asn Ala Ile Asp Glu Leu Pro Ile | | | | |
| | 305 | | 310 | 315 320 |
| Phe Phe Ile Ala Ala Ala Cys Ala Glu Gly Thr Thr Phe Val Gly Asn | | | | |
| | 325 | | 330 | 335 |
| Leu Ser Glu Leu Arg Val Lys Glu Ser Asp Arg Leu Ala Ala Met Ala | | | | |
| | 340 | | 345 | 350 |

77 184

A

Gln Asn Leu Gln Thr Leu Gly Val Ala Cys Asp Val Gly Ala Asp Phe
355 360 365

Ile His Ile Tyr Gly Arg Ser Asp Arg Gln Phe Leu Pro Ala Arg Val
370 375 380

Asn Ser Phe Gly Asp His Arg Ile Ala Met Ser Leu Ala Val Ala Gly
385 390 395 400

Val Arg Ala Ala Gly Glu Leu Leu Ile Asp Asp Gly Ala Val Ala Ala
405 410 415

Val Ser Met Pro Gln Phe Arg Asp Phe Ala Ala Ala Ile Gly Met Asn
420 425 430

Val Gly Glu Lys Asp Ala Lys Asn Cys His Asp
435 440

<210> 70
<211> 455
<212> PRT
<213> Artificial sequence

<220>
<223> Synthetic

<400> 70

Met Leu His Gly Ala Ser Ser Arg Pro Ala Thr Ala Arg Lys Ser Ser
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Gly Leu Ser Gly Thr Val Arg Ile Pro Gly Asp Lys Ser Ile Ser His
20 25 30

Arg Ser Phe Met Phe Gly Gly Leu Ala Ser Gly Glu Thr Arg Ile Thr
35 40 45

Gly Leu Leu Glu Gly Glu Asp Val Ile Asn Thr Gly Lys Ala Met Gln
50 55 60

Ala Met Gly Ala Arg Ile Arg Lys Glu Gly Asp Thr Trp Ile Ile Asp
65 70 75 80

Gly Val Gly Asn Gly Gly Leu Leu Ala Pro Glu Ala Pro Leu Asp Phe
85 90 95

Gly Asn Ala Ala Thr Gly Cys Arg Leu Thr Met Gly Leu Val Gly Val

| 100 | | | | | 105 | | | | | 110 | | | | | |
|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|
| Tyr | Asp | Phe | Asp | Ser | Thr | Phe | Ile | Gly | Asp | Ala | Ser | Leu | Thr | Lys | Arg |
| | 115 | | | | | | 120 | | | | | 125 | | | |
| Pro | Met | Gly | Arg | Val | Leu | Asn | Pro | Leu | Arg | Glu | Met | Gly | Val | Gln | Val |
| | 130 | | | | | 135 | | | | | 140 | | | | |
| Lys | Ser | Glu | Asp | Gly | Asp | Arg | Leu | Pro | Val | Thr | Leu | Arg | Gly | Pro | Lys |
| 145 | | | | | 150 | | | | | 155 | | | | | 160 |
| Thr | Pro | Thr | Pro | Ile | Thr | Tyr | Arg | Val | Pro | Met | Ala | Ser | Ala | Gln | Val |
| | | | | 165 | | | | | 170 | | | | | 175 | |
| Lys | Ser | Ala | Val | Leu | Leu | Ala | Gly | Leu | Asn | Thr | Pro | Gly | Ile | Thr | Thr |
| | | | 180 | | | | | 185 | | | | | 190 | | |
| Val | Ile | Glu | Pro | Ile | Met | Thr | Arg | Asp | His | Thr | Glu | Lys | Met | Leu | Gln |
| | 195 | | | | | | 200 | | | | | 205 | | | |
| Gly | Phe | Gly | Ala | Asn | Leu | Thr | Val | Glu | Thr | Asp | Ala | Asp | Gly | Val | Arg |
| | 210 | | | | | 215 | | | | | 220 | | | | |
| Thr | Ile | Arg | Leu | Glu | Gly | Arg | Gly | Lys | Leu | Thr | Gly | Gln | Val | Ile | Asp |
| 225 | | | | | 230 | | | | | 235 | | | | | 240 |
| Val | Pro | Gly | Asp | Pro | Ser | Ser | Thr | Ala | Phe | Pro | Leu | Val | Ala | Ala | Leu |
| | | | | 245 | | | | | 250 | | | | | 255 | |
| Leu | Val | Pro | Gly | Ser | Asp | Val | Thr | Ile | Leu | Asn | Val | Leu | Met | Asn | Pro |
| | | 260 | | | | | | 265 | | | | | 270 | | |
| Thr | Arg | Thr | Gly | Leu | Ile | Leu | Thr | Leu | Gln | Glu | Met | Gly | Ala | Asp | Ile |
| | 275 | | | | | | 280 | | | | | 285 | | | |
| Glu | Val | Ile | Asn | Pro | Arg | Leu | Ala | Gly | Gly | Glu | Asp | Val | Ala | Asp | Leu |
| | 290 | | | | | 295 | | | | | 300 | | | | |
| Arg | Val | Arg | Ser | Ser | Thr | Leu | Lys | Gly | Val | Thr | Val | Pro | Glu | Asp | Arg |
| 305 | | | | | 310 | | | | | 315 | | | | | 320 |
| Ala | Pro | Ser | Met | Ile | Asp | Glu | Tyr | Pro | Ile | Leu | Ala | Val | Ala | Ala | Ala |
| | | | | 325 | | | | | 330 | | | | | 335 | |
| Phe | Ala | Glu | Gly | Ala | Thr | Val | Met | Asn | Gly | Leu | Glu | Glu | Leu | Arg | Val |
| | | | 340 | | | | | 345 | | | | | 350 | | |
| Lys | Glu | Ser | Asp | Arg | Leu | Ser | Ala | Val | Ala | Asn | Gly | Leu | Lys | Leu | Asn |
| | 355 | | | | | | 360 | | | | | 365 | | | |
| Gly | Val | Asp | Cys | Asp | Glu | Gly | Glu | Thr | Ser | Leu | Val | Val | Arg | Gly | Arg |
| | 370 | | | | | 375 | | | | | 380 | | | | |
| Pro | Asp | Gly | Lys | Gly | Leu | Gly | Asn | Ala | Ser | Gly | Ala | Ala | Val | Ala | Thr |

186

7

385

390

395

400

His Leu Asp His Arg Ile Ala Met Ser Phe Leu Val Met Gly Leu Val
405 410 415

Ser Glu Asn Pro Val Thr Val Asp Asp Ala Thr Met Ile Ala Thr Ser
420 425 430

Phe Pro Glu Phe Met Asp Leu Met Ala Gly Leu Gly Ala Lys Ile Glu
435 440 445

Leu Ser Asp Thr Lys Ala Ala
450 455

F1

cont.